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ABSTRACT

This paper looks at the information technology infrastructure which is driving a transition toward a new information/service economy and which consequently requires a "reengineering" of higher education. Following a preface, the first chapter, "Reengineering and Related Concepts in the Literature," looks at reengineering in general, the concepts involved, organizational resistance, new forms of leadership and organizational culture, empowering individuals, developing teams, setting standards for quality, building networks, and planning and management. The second chapter, "Reengineering in Higher Education," speaks of the need for reengineering including uneasiness over the rising cost of higher education, the need to respond to student consumerism, and rapid and far-reaching change as the dominant paradigm for entering the 21st century. The balance of the chapter describes the organizational culture in academe, new paradigms for higher education, dynamics of organizational growth, and critical success factors. The final chapter, "Implications of Reengineering for Information Technology Units," looks at higher education solutions to resource issues and institutional necessities in light of new types of information technology units, the possibility of broad based "buy-ins" and the growth of campput needs and expectations. A conclusion offers a vision for future higher education developments. Included is a bibliography of over 150 items. Extensive references follow each chapter. (JB)

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The Association for the Management of Information Technology in Higher Education

Reengineering:
A Process for Transforming Higher Education

by James I. Penrod and Michael G. Dolence

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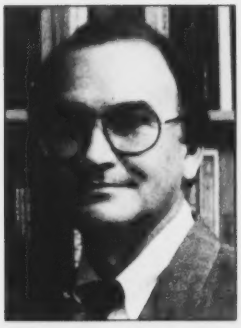

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Preface

Throughout our society today, the integration of computing and communications and the subsequent development of an information technology infrastructure is driving a transition toward a new information/service economy. As in the transition from the agrarian to an industrial economy, a new management structure must evolve to realize the full potential for innovation and productivity. The process of reengineering or transformation is based upon new assumptions about service and quality and involves redesigning work processes to take advantage of emerging technological capabilities. Reengineering is needed for business, industry, government, and educational enterprises to successfully move into the information/service economy.

Transformation involves changing many of our assumptions and principles of management and reexamining the nature of work and workers. Jobs should be organized around outcomes not tasks. Individuals should be empowered to use discretion and judgment in performing their duties and obligations. Control, accountability, and processing must be built into the work process so that individual efforts contribute directly to organizational success. Corporate databases must be widely accessible to enable organizational decision-making to be better aligned, leading to information being regarded as a real asset.

As higher education institutions adjust to pervasive financial constraints, a competitive service orientation for all constituents, and recognition of far-reaching change in the coming century, reengineering holds significant potential to revitalize and reshape their functions and adaptability. This professional paper was written for professionals in higher education information technology (IT) management, to give them a background understanding of the basic principles of reengineering and related management concepts and show them how—and why—to effect appropriate change in their organizations and on their campuses.

Engaging an institution in a reengineering process requires a very serious commitment. It takes years rather than months to move through the basic transition, and in one real sense it never ends. There will be strong initial resistance to such major change, as employees at all levels defend their traditional turfs and work styles. Dealing with such resistance requires strong leadership by people who are capable of being designers, teachers, and stewards of a learning organization, rather than stereotypical heroes. Such leaders must introduce a new organizational culture stressing individual responsibility, responsiveness, and service. Individuals must be empowered through the formation of self-directed teams or work groups which have primary responsibility for planning, controlling, and improving work processes. New techniques such as Total Quality Management can increase the quality of performance by a magnitude. The supporting organizational structure becomes flatter and more flexible, and utilizes formal networks of diverse knowledge workers who communicate with each other, clients/customers, and suppliers through a variety of electronic means. During transformation, difficult issues require attention: policy/procedure development in a rapidly changing environment, heavy and ongoing educational requirements, and technophobia. Finally, a well-conceived strategic planning and management framework is needed to fully interweave the principles of transformation with related tenets.

At its foundation, the process of reengineering depends upon the development of a viable information technology infrastructure. That requires IT units and IT leaders to be conversant with and strong proponents of transformation principles. Yet they, too, are facing budget cuts, increased demands by constituents, and higher operating costs. IT organizations, then, must not only transform themselves, they must participate actively in reengineering the entire institution. The IT unit must assume responsibility for the evolutionary design and development of the technology infrastructure; it must also share responsibility for infrastructure operation with other units. IT leaders and managers must position themselves at the forefront of the reengineering movement.

James I. Penrod
Michael G. Dolence
March 1992

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Reengineering and Related Concepts in the Literature

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Technological change defines the horizon of our material world as it shapes the limiting conditions of what is possible and what is barely imaginable. It erodes taken-for-granted assumptions about the nature of our reality, the "pattern" in which we dwell, and lays open new choices.[1]

— Shoshana Zuboff

The basic assumptions about how to manage enterprises or institutions have changed little in the last fifty years. In simplistic terms, the following philosophy has been widely accepted and practiced: clearly state the goals, define what needs to be done to accomplish them, translate the work requirements into expectations of the employees, communicate the expectations, and evaluate the results. This "expect and inspect" philosophy worked well for many years. Leaders and managers promoted and rewarded those subordinates who complied with policy and procedures and punished those who did not. The axiom "that which is rewarded, gets done" was firmly established. Smoothly functioning operations were said to "run like a railroad."[2]

During the past two decades something happened—first in mass-production manufacturing, then in service companies and non-profit entities. Customers or constituents experienced growing disaffection, employee turnover increased, sales flattened or fell, operating expenditures for non-profit institutions rose dramatically, and productivity had slower than expected growth.

In this same time frame, there was almost universal automation in all sectors of this country. Significant proportions of operating budgets were channeled to build information technology infrastructures. The general expectations and promise that such investments in information systems and communication technologies would enhance productivity and efficiencies of operation were not realized. At best, the results have been mixed and many CEOs are now profoundly disappointed. What is wrong? Why have investments in information technology not yielded dramatic increases in productivity and improved services to clients?

What is reengineering?

A number of authors including Peter Drucker, John Naisbett, Tom Peters, Alvin Toffler, and Shoshana Zuboff have offered explanations as to the root causes of the problems we face, and have set forth meaningful ideas to overcome our difficulties. Two well known management consultants have further synthesized the concepts discussed by others and put forth similar tenets concerning the need for organizational *transformation* or *reengineering:* Richard L. Nolan and Michael Hammer both have challenged established notions about work.[3]

The last basic transition which occurred in this country was the shift of the agrarian economy to an industrial economy. It is not coincidental that many of the theories and practices of modern management began to be formulated at that same time. We are now, however, in a period where the industrial economy is shifting to an information/service economy.

Two key lessons were learned from the last transition.

The first was that some underlying technology drives the transition: the steam engine was refined to the internal combustion engine which gave way to the turbo jet engine; today the integration of computing and communications is driving the transition toward the new economy. The second lesson was that productivity gains require both incorporating the new technology and changing the organization structure for doing work. The industrial organization model led to the development and growth of the bureaucracy. It is now time for a new management structure to evolve to serve the information/service economy.

Failure to achieve anticipated productivity to date is due largely to the fact that even though existing business practices have been automated, speeding up those old processes unfortunately cannot address their fundamental performance deficiencies. The job descriptions, work flows, control mechanisms, and decision-making structures were developed in a very different competitive environment and well before the advent of the computer. Serial processing, efficiency, and control were primary elements in the design. To meet the pressures of today, parallel processing, speed, service, quality, and innovation must be incorporated into the new model.

We have come to the point, then, where we must "reengineer" our basic business processes whether we are in a business, industry, government, or educational enterprise. Reengineering can be defined as using the power of modern information technology to radically redesign administrative business processes in order to achieve dramatic improvements in their performance. It is the process for transforming organizations and the way work is done within them. The reengineering process requires a critical reexamination of *all* basic assumptions about the way things are done. It involves redesigning work processes based upon new assumptions about service and quality, molded to fit both existing and emerging technological capabilities.

The concept of reengineering or transformation is known by a variety of other names, including restructuring, process design concept (PDC), work or business process redesign, high productivity program (HPP), managing office productivity (MOP), and organizational redesign. Within the context of information technology literature, reengineering is a relatively new phenomenon emerging in the late 1980s.[4]

Understanding Reengineering

To date, most of the productivity increases realized through technology have come from brute force automation followed by cutting and squeezing the work force. At best, little remains to be gained by further pursuit of these strategies, and, at worst, the savings realized through these methods have been disappointing. This is particularly true in higher education, where many major automation projects are financed primarily through redirected funds, and where the last few years have brought significant cutting and squeezing in most states and in all types of colleges and universities. These strategies are almost always associated with incremental thinking: small changes are possible and realistic, but changes of magnitude in increased effectiveness are not feasible. Brute force automation, cutting and squeezing, and incremental thinking are not methods of transformation.

According to Michael Hammer, to reengineer administrative processes requires us to start from scratch in making fundamental assumptions, to reject much of the conventional wisdom abundant in all organizations, and to "think out of the box" by looking for ways to initiate changes of magnitude through innovation.[5]

We need to *start from scratch in making assumptions* because very significant environmental and technological changes have occurred since most processes now in use were conceived. To begin the redefinition process we might ask the fundamental questions, "When were the processes currently being used designed?" and, "Can we design a better process given the technology we now have and/or will have shortly?" It is a reality that most organizations are much more complex than they were even a few years ago. The introduction of sophisticated technological systems and the vast quantities of data commonly stored in management information systems play significant roles in this complexity. Many of the processes that govern work in such complexity are breaking down. Unfortunately, some of these processes simply evolved over time and were never really designed in the first place. Where processes were initially well designed, many have been changed or retrofitted several times over and need complete rethinking rather than continued modification.

The need to *reject conventional wisdom* is illustrated by the widely practiced adage, "If it ain't broke, don't fix it." Just because it is not broken does not mean that the process is doing the job right or even doing the right job. Rewriting the rules to provide advantage over competition, taking into account technological potential and the resulting impact upon human actions, must be paramount. The myth of technology taming the paper tiger is another example. The introduction of technology has not reduced the amount of paper produced but has made the problem worse. It is estimated that by 1992 an information worker will consume 24,600 pages per year. Since World War II, paper consumption has been growing at triple the rate of the GNP. The average company stores 70 percent more paper than necessary, never refers to 85 percent of all stored documents, and wastes 65 cents of every dollar spent producing, storing, and retrieving paper records.[6] Finally, metaphors such as "running like a railroad" were very illustrative in the industrial economy but are long past usefulness today. We need to use technology to solve problems, and that requires a fresh look at long-held ideas which provide the framework for many policies and procedures. We also need to come up with metaphors which fit an information/service economy to better communicate what and how things should be done.

We need to *think out of the box* if we are to meet the constant increase in competitive pressures, and establish

new standards of performance. In some circumstances, this may involve working harder; in almost all situations, it will require working smarter, with serious consideration of cost, quality, speed, and, most importantly, service.[7] Any evaluation of this nature must reexamine an unspoken but too commonly felt assumption that, all things being equal, it is better to rely on technology and systems than on human beings. The thinking goes that in the long run technology and systems cost less and are infinitely less trouble to manage. The fact is, however, the more technology becomes an integral part in delivering services, the more important personal interactions are in satisfying clients and customers and in providing differentiation between competitors.[8] Inspiration and innovation by people will more and more become critical components in meeting new challenges and expectations. The technological infrastructure is necessary and will be an enabling force to unleash human creativity—our human creativity that, in the end, makes the essential difference.

Nolan notes that at the core of changing most of our assumptions and principles of management are key concepts about work and workers. Physical and clerical routine work is disappearing as automation continues. The distinction between blue-collar and white-collar work becomes obsolete with a shift to more knowledge work, i.e., dealing with concepts and information. Defining and understanding knowledge work is of national importance and must be a priority for campus leaders.[9] Hammer states that before a transformation can take place, jobs must be reengineered, individuals must be empowered and held accountable, there must be an ascendancy of real work—where an individual's efforts contribute directly to organizational success—and information must be regarded as a real asset .[10]

Reengineering jobs requires that work be organized around outcomes, not tasks. This will put a very different focus on most existing job descriptions which almost always are simply lists of tasks to be performed. The reengineering principle implies that, where possible, one person should perform all the steps in a given process—a purposeful movement away from the centuries-old notion of specialized labor and from the limitations inherent in a paper filing system. It also implies that those who use the output of the process perform the process. The availability of computer-based data and expertise provides opportunities for departments, units, and individuals to do more for themselves which, in turn, leads to the assumption of greater individual responsibility and fewer mistakes in processing.

The *empowerment of individuals* means that we put the decision point where the work is performed and that the individuals themselves control the process. This contradicts a basic assumption of bureaucracy—that people actually doing the work have neither the time nor the inclination to monitor and control it, and that they lack the ability to make decisions about it. If the doers become self-controlling and self-managing, hierarchy and the slowness and inflexibility associated with it begin to disappear. Empowerment is not allowing individuals to use their abilities freely, but rather to use them wisely. It enables people to use discretion and judgment in performing their duties and obligations and significantly increases the possibility that the work is a rewarding experience.

To bring about an *ascendency of real work* means that control, accountability, and processing must be built into the work process, not be part of "other" extensions to it. The best way to begin bringing this about is by capturing data only once, at the source. Networks and integrated databases make it relatively easy to collect, store, and transmit information today. This eliminates any reason to live with delays, entry errors, and overhead associated with different individuals, departments, or units repeatedly collecting the same data. The second part of the principle of ascendancy of real work is to have those who are responsible for producing information also be accountable for processing it. This may well require moving work from one person or department to another person or department. It certainly disputes the long-held idea about specialized labor and the assertion that people at lower organizational levels are incapable of acting on information they generate. These ideas go hand-in-glove with the concept of empowerment.

For *information to be regarded as a real asset,* a corporate database must play a critical role in organizational decision-making and be accessible by a wide range of decision-makers at all levels. Linking parallel activities rather than integrating the results enables broader access in quicker timeframes. One kind of parallel processing is depicted by separate units performing the same function. Another is separate units performing different activities that eventually must come together. This suggests forging links and coordinating between parallel functions while in process rather than at completion. Building a network of this nature makes it possible to treat geographically dispersed resources as though they were centralized. The arguments regarding the benefit and tradeoffs of centralization versus decentralization are of long standing in almost all organizations. Now databases, networks, and standardized systems allow for benefits of scale and coordination while maintaining the benefits of flexibility and service. Indeed, some of the best of both worlds can be realized.

Implementing the Concepts

Although the basic concepts of transformation or reengineering are straightforward and relatively simple, implementing them is a major undertaking by any existing organization. It will generally involve: (1) overcoming organizational resistance; (2) adopting a different style of leadership; (3) introducing a new organizational culture; (4) empowering individuals; (5) developing flexible teams and self-oriented workgroups; (6) significantly and continually raising standards, many times through endeavors such as total quality management (TQM) programs; (7) redefining the organizational structure; (8) creating well designed internal

and external networks that rely on social interaction and electronic communications; (9) addressing a whole host of auxiliary issues such as new policy/procedure development, ongoing training and education, dealing with technophobia, and so forth; and, finally, (10) seeing that all of this fits together through good strategic planning and management.

Overcoming Organizational Resistance

If an organization is to be transformed it must engage in a prolonged change process. Change of major magnitude almost always is threatening. When individuals feel as if they may be threatened or embarrassed, they are likely to engage in defensive reasoning. Argyris sets forth the following ideas about the causes of defensive reasoning, when it is likely to occur, and seven potential consequences.[11] It is important to keep these thoughts in mind in reengineering and to build countermeasures into the process to offset them.

The primary causes of defensive reasoning are that the individuals have developed human programs within themselves to deal with threatening or embarrassing circumstances, and most people, especially executives, are very skillful in using these programs. Many organizational defense routines result from individual actions, and fancy organizational footwork is routinely used to protect these defensive routines.

People engage in defensive reasoning when they hold premises which are questionable, but believe them to be valid; make inferences that do not necessarily follow from given premises, but believe them to do so; and reach conclusions that cannot be tested, but believe them to be carefully proven.

When they exercise defensive reasoning, management at all levels can create worlds that are contrary to what they say they prefer and certainly contrary to their managerial stewardship. The barriers created by these old defensive mechanisms prevent them from changing what they believe needs to be changed. When this occurs, seven critical errors, any one of which could sabotage a reengineering effort, may be made. They are:

(1) *Actions intended to increase understanding and trust often produce misunderstanding and mistrust.* Two examples are illustrative. A manager leaves a meeting believing that full agreement has been reached and a set of actions will be forthcoming. Later, when commitments are not met, the explanations are evasive and unsatisfactory. Or an executive involves managers in a participative meeting to make some very difficult decision only to find that the participants are unwilling to ask each other tough questions. The disappointed executive eases out of the participative exercise, leaving other participants confused. Failure to bring such circumstances into the open and resolve them almost always assures misunderstanding and distrust.

(2) *Individuals may protect themselves by blaming the system or others for prior decisions.* When major mistakes are discovered, some may use politically motivated actions, fail to come forth with the whole truth, and/or fall back on the old excuse of just following rules and procedures. Such individuals think that positioning is more important than really getting to the cause if it avoids unpleasantness, embarrassment, and threat. Behavior such as this must be modified.

(3) *The tried and proven ways of doing things dominate organizational life, leading to organizational inertia.* This tactic takes a number of forms, among them creating apparent motion to assure others that actions are being taken in an effort to buy time to figure out what to do; doing the same thing again, faster, and more carefully this time; and throwing out idea killers such as, "I don't have the authority," "It's not policy," "The CEO won't like it," or "We just don't do it that way." Breaking the domination of the past is of critical importance.

(4) *Upward communications for difficult issues are often lacking.* Fearing that the messenger may bear the blow for the message, mid-managers may fail to pass along information about negative attitudes, expectations, and production or service problems. In so doing, they fail to show proper respect for front-line employees and/or adequate understanding of the process necessary to enhance timeliness, quality, and output. Free-flowing communication channels should be an organizational priority.

(5) *Budget games are necessary evils.* Skillful managerial manipulators are adept at concealing the real magnitude of a new program, supporting a request with voluminous data of which the significance is not clear, arguing that the real benefit is subjective, basing a specific request upon a supposedly approved program which in fact has not been approved, etc. Refusing to reward game players and insisting on straightforward, understandable budget requests can help eliminate this organizational evil.

(6) *People do not behave reasonably, even when it is in their best interest.* When faced with upsetting facts, people may behave unreasonably. In difficult situations the most common defenses are procrastination, indecision, lack of implementation follow-up, strategic ineffectiveness, regression, rejection, and sabotage. Such reactions can be surmounted if there is a strong sense of trust and understanding in the organizational culture.

(7) *The management team can be a myth.* Although almost all CEOs and other leaders make persistent references to "our management team," in many cases such references may in fact perpetuate a legend rather than reflect reality. A true management team requires leadership, shared values, and joint access to information.

Argyris notes that although they are widespread, these harmful defensive tactics need not be inevitable, and where they are found they can be turned around. However, he also states that many of the programs aimed at creating more competitive organizations do not directly address them.[12] If fully implemented, reengineering will.

Adopting a Different Style of Leadership

Leadership is perhaps the key issue in reengineering. According to Peter Senge, the traditional view of leaders is

one of stereotyped *heroes*, special people who set the direction, make the key decisions, and energize the troops. They are great men and women who rise to the fore in times of crisis. Most may agree that this perspective is a myth, but as long as such myths prevail, they reinforce a focus on short-term events and charismatic personalities rather than on systemic forces and collective learning.[13]

Leaders in a reengineering environment are responsible for building organizations where people are continually expanding their capabilities to shape their future. Senge states that such leaders are responsible for organizational learning and must be designers, teachers, and stewards. These roles require different skills from those possessed by most charismatic heroes. Building shared vision, bringing to the surface and challenging prevailing mental models, and fostering more systemic patterns of thinking are necessary actions of leaders.[14]

Strong leadership is essential in transforming organizational culture. In a decentralized, structured organization (such as a university), standard operating procedures determine the focus of attention for organizational participants unless the leader intervenes. Thus, one element of leadership is the ability to direct the attention of other organizational members. Cyert identifies three mechanisms to help perform this function: communication between leader and participants, role modeling, and reward systems. Belief in mission and an honest dedication to the people who must carry it out are crucial to good communication. Role modeling is another form of communication: a leaders' behavior sends a message to followers whether the leader intends it to or not.[15] The reward system in a transformed environment will be substantially different from what has been commonly accepted. The prevailing philosophy, "what gets rewarded gets done," must be revised to "what is rewarding gets done." The leader must build a set of shared values, an idea structure that can be followed, and form covenants with participants which define meaningful, worthwhile work and the accompanying obligations and duties. Good leadership sets examples by following intellectual ideals. Good followship, then, comes from both intrinsic and extrinsic value-based reasons. And the best leaders are those who follow best.[16]

Introducing a New Organizational Culture

The transformation of an institution will probably begin with a redefinition of prevailing organizational culture. Schein defines organizational culture as "the patterns of basic assumptions which a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, which have worked well enough to be considered valid and, therefore, are to be taught to new members as the correct way to perceive, think, and feel in relation to those problems."[17]

According to De Lisi, the needed change is from a culture of professional management to one of entrepreneurialism. Comparison invites a long list of contrasts where movement from one culture to the other will include moving from external controls to individual autonomy; from rational/logical decision-making to intuitive decision-making; from centralized systems to distributed networks; from vertical hierarchies to horizontal networks; from adult-child to adult-adult professional relationships; and from organization-centered to person-centered focus.[18]

Much of an organization's culture has a direct impact on the quality of worklife and vice versa. Focusing upon the improvement of quality of worklife, then, can be significant in a reengineering effort. Consider the following, from a recent *Sourcebook* article by Katy Koontz. *First*, people must feel challenged by their work. They must be given the opportunity to grow and stretch their skills. *Second*, people need feedback. In the absence of positive feedback people give themselves negative feedback. *Third*, rewards must be in line with expectations. Competitive salaries and benefits are necessary to keep good employees satisfied, but, as noted above, rewards of the future will be value centered. People who feel high self esteem consistently outperform the mean. Recognition, appreciation, and other non-tangible rewards are an important part of building high self esteem. *Fourth*, people who feel involved do a better job. Involvement means creating an environment where individuals feel that their contributions matter. In order to feel involved they must be brought into the loop, given information, and empowered to act upon it. *Fifth*, employees who are given the opportunity to learn are more loyal and more capable of contributing to the value chain. Current estimates are that between 10 and 20 percent of a knowledge worker's time should be devoted to learning. Career stagnation is generally not tolerated by the best employees. During the industrial age, long step-by-step career ladders were developed to give employees someplace to climb. In the flat organization of the information/service age, new creative approaches need to be developed. The *sixth* and final area of concern is the physical work environment. Creating efficient, effective, and pleasing conditions helps significantly in maintaining high morale.[19]

All of these changes are building toward a new type of organization, which has been described by Senge as a learning organization, a community of people continuously expanding their individual and collective capacity to create desired results.[20]

Empowering Individuals

Peter Block sets forth one of the best discussions of the concept of empowerment by contrasting what he calls the "bureaucratic and entrepreneurial cycles."[21] Each cycle consists of four parts:

The first part of the bureaucratic cycle is a *patriarchal contract* between the organization and the employee. This traditional contract places emphasis on a top-down, high control orientation that stresses clarity of roles, levels of authority, and the need for discipline and self-control. In an *entrepreneurial contract*, however, this attitude is contrasted with the belief that the most trustworthy source of authority comes from within the person. The task of management is to

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help people trust their own instincts and take responsibility for the successes of the organization.

Part two of the respective cycles *contrasts myopic self-interest with enlightened self-interest.* In myopic self-interest, success is defined as moving up the ladder, gaining authority and responsibility, and being financially rewarded. People soon learn to shift their focus from doing meaningful work to moving up the hierarchy. On the other hand, in the entrepreneurial cycle, success is counted in terms of contribution and service to customers, clients, and other units. Rewards come from meaningful work, the opportunity to learn and create specialness, and the chance to grow through one's own efforts. Advancement and pay are important but of a secondary focus.

In part three, *manipulative tactics are contrasted with authentic tactics.* In a bureaucracy, an autocratic culture and personal ambition support manipulative behavior—that which is expedient, cautious, and indirect. Traditional politics is the art of controlling people without letting them know you are doing it. It is commonly believed that one must be manipulative to succeed. Authentic tactics, however, encourage people to be direct and authentic in management style. That means letting people know where they stand, sharing information, sharing control, and taking reasonable risks. These tactics minimize the belief that one must be calculating and controlling to move up, but they do require courage.

Part four *compares dependency with autonomy.* The patriarchal contract fosters the belief that our survival is in someone else's hands. Through much of our early life, we are conditioned for dependency and the traditional reward system helps to maintain that condition. Autonomy, on the other hand, reduces our need to give attention and power (and, often, fear) to those above us, and demands that we take responsibility for our actions. It helps the organization to support courage and independence.

Developing Teams and Workgroups

Empowering is the act of passing on authority and responsibility. Empowerment, then, occurs when power goes to employees who experience a sense of ownership and control over their work. In the flatter organizations of the information/service economy, one form of empowerment comes from the formation of self-directed teams or work groups. Their job design is based on multiple tasks dealing with an entire process coupled with the responsibility for producing the desired outcomes. The role of management in this structure is coach and facilitator, and leadership is shared with the team. The information flow is open and shared with all team members, various levels of managers, and others with a "need to know." The work group has primary responsibility for planning, controlling, and improving the process.

Wellins, Byham, and Wilson identify a variety of characteristics related to accomplishing organizational goals and meeting the needs of the changing work force that point toward the development of more self-directed teams. They include:[22]

✓ *The ability to attract and retain the best people.* It is estimated that sixteen million new jobs will be created in the decade of the 1990s, with only fourteen million people qualified to fill them. Organizations that offer a culture that best matches the values of the new work force will acquire and retain the best people. Teams offer challenge, greater participation, and the opportunity for real accomplishments.

✓ *A better response to new worker values.* Autonomy, responsibility, and empowerment are valued by new employees of today and self-directed teams provide them all. Surveys show that the challenge, participation in decision-making, and work that results in realizable accomplishment are more important to new employees than high pay.

✓ *Fewer, simpler job classifications.* As technology contributes to the complexity of the workplace, the need for flexibility grows. Work groups are designed to facilitate job sharing, cross-training, and multi-skilled individuals.

✓ *Faster response to technological change.* Today technologies call for higher work skills and individuals who can work together to solve problems. Teams help provide the communication channels and the responsiveness needed to make computing and communication networks function.

✓ *Reduced operating costs.* Budget crises have led to the elimination of layers of mid-managers and supervisors. More and more decisions must be made at lower levels. Teams provide a vehicle for front-line employees to successfully assume these responsibilities.

✓ *Greater flexibility.* Today's expectations test an organization's ability to be responsive to customers, clients, and the marketplace. Work groups can communicate better, discover more opportunities, find better solutions, and implement actions more quickly than other traditional organizational entities.

✓ *Improved quality, productivity, and service.* The act of continuous improvement, called *kaizen*—a cornerstone of Japanese management—leads to better quality, productivity, and service. These characteristics are essential to an organization that hopes to compete in the information/service economy. The team concept gives a sense of job ownership that leads to *kaizen.*

Setting New Standards for Quality

Whether they are called total quality management (TQM), total quality control (TQC), market driven quality (MDQ), or are based on Deming's fourteen points,[23] new programs at organizations across the nation are aimed at substantially enhancing the quality of products and services. Common to all of these approaches is the idea of introducing new standards or measures that are much higher than prior expectations. Striving for the "six sigma goal" is common. This refers to instituting processes that result in probable errors or mistakes beyond the cutoff points on a normal curve six standard deviations from the mean, or committing less than 3.4 errors per one million chances.

The following illustrations demonstrate the challenge before us: It is estimated that the probability of losing a checked bag on an airline flight with a change of planes is one sigma; getting the correct bill in a restaurant is three sigma; getting the right prescription from a physician is three sigma; but arriving safely from an airline flight is the desired six sigma.[24]

Clearly, achieving this level of quality delivery is a major part of what reengineering is about. There is not, however, only one right way to make this happen. David Garvin describes attributes of quality which provide considerable insight into how managers must think of quality as strategy if six-sigma results are to be realized.[25]

✓ *Performance* refers to a product's primary operating characteristics or the way in which a service is rendered. Both products and services have attributes that can be objectively measured and are frequently useful in establishing standards. Other standards, however, are based on subjective preferences and are more difficult to establish. It is critical to know the customer or client, to understand their preferences, and to periodically seek feedback if standards in subjective areas are to be useful.

✓ *Features* supplement the basic functions of a product or service. They are the "bells and whistles" which may add quality. The usefulness of particular features to particular individuals may constitute a rationale for measurement. Another rationale might focus on available options and the ability for a customer or client to customize by selecting features. Here, as above, standards will be based on both objective and subjective measures, and knowledge of the clientele is very important.

✓ *Reliability* reflects the probability of a product malfunctioning or failing to satisfactorily render a service within a specified time period. The mean time to first failure/error, mean time between failures/errors, and the failure/error rate per unit time are common measures. Where products or services are consumed instantly, more subjective measures again may be useful.

✓ *Conformance* is the degree to which a product's design and operating characteristics or the way a service is rendered meets established standards. Products and services of all kinds involve specifications of some sort. Product conformance can be measured as a variation from the center of a specified range. Measures of service conformance focus on accuracy and timeliness and include counts of processing errors, unanticipated delays, and other mistakes.

✓ *Durability* can be defined as the amount of use one gets from a product before it deteriorates, or the length of time a service can be continually provided with satisfactory results. When some products fail they can be repaired; with others, failure results in the end of usefulness. In either case, measures similar to those used for reliability standards are fairly straightforward. The concept of durability of service is most useful in establishing reasonable work periods where providing the service requires intense concentration.

✓ *Serviceability* relates to the speed, courtesy, competence, and ease of repair/correction of a product or service. Attitudes demonstrated in correcting outstanding problems and in handling complaints dramatically affect customer or client satisfaction. Some of these variables can be measured quite objectively, others reflect differing personal standards. Despite the difficulty of deriving them, subjective standards for professional behavior are very important.

✓ *Aesthetics* refers to how a product looks, feels, sounds, tastes, or smells, or to the setting in which a service is rendered. In each case, personal judgment and individual preference are paramount; therefore, subjective criteria must be used for measurement. Assessing the perceptions of customers or clients is important, but it must be noted that it is impossible to please everyone.

✓ *Perceived quality* is directly related to the reputation of a product or service. Image, inference, association, advertising, and public relations can play roles in public perception and, for a time, may be as important as the reality. This is a most subjective dimension but a significant one. Establishing a good reputation for a new product or service may be easier than overcoming a bad one.

Redefining the Organizational Structure

Nolan defines organizations as the structures used to specify relationships between people to do the work. In the agrarian economy, the family farm was an effective structure for small work groups. Bureaucracies emerged in the industrial economy designed to efficiently carry out mass production and mass distribution while mobilizing large groups of specialized workers toward shared objectives over sustained periods of time. Nolan contends that over the past fifteen years functional hierarchies have begun to dismantle themselves by eliminating layers of mid-managers and reducing the proportion of operational and clerical positions while the proportion of knowledge workers has increased significantly. These new *network* organizations will formalize structures during this decade.[26] Many agree with him; others are more cautious.

Goodman, Sproull, and Associates find today's hierarchies fairly rigid and slow to change. Furthermore, they do not believe that we completely understand the process of changing organizational structure. They suggest that change will come through experiments that combine technology with people willing to develop flexible structures that are both centralized and distributed at the same time. Flexible procedures can replace rigid ones once the entire organization is interconnected with personal computers and networks. Organizational databases and expert systems could act as surrogates to approve routine decisions. Structural relations within organizations can then be substantially altered.[27] Evolution toward a network structure, however, seems consistent with their perspective.

Rockart and Short list eight dimensions of change involved in a networked approach to organizational functioning.[28]

(1) There is *increased role complexity brought on by continuous changes* in products, markets, processes, and organization. Managers will need to adjust more rapidly to new situations. Organizations must also respond to competitive pressures by continually improving internal processes. Again, managers will have to react and frequently structural change will result.

(2) The *manager's need to cope with unclear lines of authority* and decision-making is heightened. Uncertainty increases as the complexity of shared work, decision-making, expertise, and accountability increases. Since good managers respond to uncertainty by sorting things out for themselves, individuals will see things differently in many circumstances. The resulting conflict and uncertainty will be very uncomfortable for many.

(3) There are *increased skill requirements* in moving to a networked organization. Higher order analysis, conceptualizations, intuitive capacity, experience, and interpersonal skills are necessary to work effectively with others.

(4) There will be *many teams* that are problem-focused and outcome oriented. New managerial skills and role definitions will be required as there is growth in peer-to-peer as opposed to hierarchical activities.

(5) *Measurement systems* need to be changed to assess individual, team, or suborganizational success. New measurement approaches are needed in an environment where cooperative work is increasingly the norm. The evolution of such measurement systems will almost certainly lag behind other organizational changes.

(6) *Changing accountability and authority* will require cultural adjustments. The entire current generation of managers has been trained to equate accountability with full control over resources. The future will require managers to share resources and to operate in an environment with more diffuse accountability and responsibility.

(7) Network organizations will require *changing the planning process.* Information technology enables new planning approaches, better access to information, and better information management which allows institutions to target activities more selectively. The available technology provides the ability to move relevant data to decision-makers at all levels simultaneously. Planning cycles can be shortened and changes in direction communicated rapidly.

(8) *Changing the technology infrastructure* is a senior management priority. Developing the data management systems and an organization-spanning network requires short-term expenses for long-term gain. Such decisions are difficult to make in today's world but are crucial for the future. As technology and business processes become even more intertwined, changes in either will influence and respond to the other. The synergy which can result in major innovation and change requires a favorable cultural setting.

Building Networks

Networks encompass alliances and joint ventures with other organizations, informal ties among internal managers, teams that work across functions, and new ways of sharing information using telecommunication infrastructures, management information systems, and other such technologies. Such networks in the 1990s are designed to build competitive advantage, i.e., superior execution in a volatile environment. They should empower managers to communicate openly, candidly, and without fear, to test motives and build trust, to enrich the quality of decisions, and to evaluate problems from the perspective of the client/customer *and* the organization rather than from a departmental interest. Networks matter to the enterprise when they affect patterns of relationships and change the frequency, intensity, and honesty of dialogue among members on specific priorities.

Charan defines a formal network as a recognized group of individuals (managers and knowledge workers) assembled by the senior executive team.[29] Such a network differs from a team, task force, or other ad hoc group in three important ways:

- *Networks are not temporary.* Ad hoc groups cannot sustain change in the behavior of the organization; networks are designed to do just that. A functional network over a period of time reshapes personal relationships, builds a shared understanding of business processes, and affects performance.
- *Networks do more than just solve problems defined for them.* They are dynamic and they take initiative. They provide a new mechanism for individuals to make their presence felt.
- *Networks make demands on senior management* that ad hoc groups cannot. With the employment of networks, executives no longer make all substantive operating decisions. Their job is to shape personal relationships and processes that allow network members to make decisions. The executives must be adept at diagnosing organizational behavior, relationship building, constructing a measurement and reward system, and providing the needed organizational linkage.[30]

Charan describes social architecture as the foundation of a network. This refers to the mechanisms through which key members make trade-offs, and to the flow of information, power, and trust that shapes how the trade-offs get made. For a network to be effective as designed, senior management must drive the process of building the appropriate social architecture. There are three important steps in doing this. First, the network must be designed. A basic objective is to find the right mix of individuals whose organizational understanding, personal motivations, and functional expertise allow them to produce the expected outputs within specified time frames. Second, senior management must deal with mismatches when the performance of members whose behavior hurts the network becomes visible. Networks will tend to bring to the forefront informal leaders with exceptional competence and to reveal individuals who cannot make the change to do business in this new way. The social

architecture will break down if problem people are not removed from the network. Finally, an intense and sustained focus on the fundamentals of organizational mission and goals, rather than on more abstract concepts, is necessary. This is not to say that appeals to culture, teamwork, or values are not important to the organization, but that the purposes of networks are to develop professional trust and to enhance understanding of the specifics of the business.[31]

Addressing Auxiliary Issues

As the process of transformation gets fully under way, many other issues that require attention may be recognized, such as policy/procedure development, ongoing education and training requirements, and technophobia.

The degree of change required for reengineering is significant and ongoing. Not only will much policy and most procedure need to be rewritten, the basic style of how such documents are presented will need to be substantially modified. As the timeframe for decision-making decreases due to enhanced communications capabilities and increased customer/client expectations, policies and procedures *must support the frontline worker's efforts.* Significant limits have been placed on what such people were allowed to do; this must change. Additionally, as the number of knowledge workers grows, the level of detail usually found in current procedures will no longer be relevant and could be detrimental. Finally, processes and systems will change much more frequently in a transformed organization than in the past; thus, policies and procedures will also change often, and will have to be readily accessible online.

Reengineering leads to organizations that are capable of learning (this process is discussed more fully in Chapter 2). The need to understand how organizations learn and to accelerate that learning is more important than ever before. Most of what has been discussed thus far ipoints to the necessity to integrate thinking and acting at all levels of the organization. For this to occur, *ongoing training and education of the entire workforce must take place.* Research has shown that increased training significantly decreases the turnover rate, by as much as 50 percent. With leaner work forces in place, organizational stability will impact productivity. Other studies indicate that an investment of 50 percent of an employee's salary in activities to eliminate turnover—such as education—could reap a pay-back within one year.[32] To date, few organizations have invested in education and training as they must for transformation to occur.

Research by Rosen, Weil, and others shows that *technophobia or computerphobia is a real problem* with university students in the United States today. Computerphobia is defined as a resistance to talking or thinking about computers, anxiety about computers, or hostile or aggressive thought about them. Findings indicate that: (1) tests have been developed to identify those with computerphobia, (2) up to one third of the population may be affected in some way, (3) there is no clear personality profile delineated for computerphobics, (4) computer experience does not "cure" computerphobia, and (5) computerphobia can be overcome through intervention techniques.[33]

If these findings apply to the general public there are major ramifications for reengineering. Since there appears to be no easy way to identify computerphobics except by testing, it may be important to initiate testing of individuals who are not as productive in using technology as might be expected. The widely held belief that computerphobia will cure itself as more and more people gain experience with computers may well be unsound. In addition to providing technological training and education, it may also be necessary to provide intervention exercises to help some individuals overcome computerphobia before they can function productively in a reengineered organization. This would need to be done in the context of a learning organization with empowered individuals who might be less inclined toward defensive reasoning than is common today.

Strategic Planning and Management

Finally, strategic planning and management structure the framework which allows reengineering principles and related tenets to be interwoven, more fully developed, and implemented.

The aim of strategic planning is to exploit the new and different opportunities of tomorrow while minimizing the negative aspects of the unexpected challenges that will surely occur. The aim of strategic management is to create an organization capable of doing that. Coupling strategic planning and strategic management is required for reengineering to be successful. The elements involved in this are to understand the environment in which the organization functions, define organizational mission and goals, identify options, make and implement decisions, and evaluate actual performance or organizational outcomes. It is essential that planning for information technology be completely integrated into the organizational strategic planning and management process.

Strategic planning calls for an analysis of the entire organization and an assessment of environmental factors and their impact on the institution. Such planning is based on inputs from a variety of constituents and functional areas, and provides direction for, and constraints on, the whole enterprise regarding both strategic and tactical directions. It sets forth a vision of the future and defines goals and operational objectives for accomplishing the vision.

Clearly defining a vision can help generate support from both internal and external groups, develop coherent future-oriented decision-making, assist in the resource allocation which is so important in reengineering, improve the organizational and institutional image, and encourage organizational teamwork while creating smoother relations between units.

A strategic planning process must fit the environment of the organization and institution where it is implemented. This requires political astuteness and a solid understanding of the culture of the place and time. Successful information

technology planning requires strong support from the top of the institution, a focus on organization-wide priorities, broadly based participation, structure and organization, staff support, and institutional guidelines. It must culminate in evolutionary policy, procedures, and decision-making which are designed to support the transformation process.

The adaptation of a planning model is perhaps the best way to introduce strategic planning and management into the institution. Before implementing a selected model, administrators should agree on a plan and should set it forth in a formal charge. The model should incorporate an internal and external assessment of environment, in addition to a values analysis, which will lead to the development of an extended mission statement, goals and objectives, broadly based operational strategies, institution-wide tactical plans, and unit-based action plans and individual behaviors.

The evaluation of a strategic planning system should begin by answering the following questions: Are decisions really affected, or different because of the process? Does the process work? The senior administration, the operational administrators, the planning committee, the planning support staff, and campus or perhaps systemwide personnel or a consultant should be involved in the evaluation process. A variety of formal and informal methods that solicit feedback from the entire institution may be utilized.[34]

Strategic planning and management is important, and literature on the subject is growing. The works of Robert C. Shirley, John M. Bryson, and George Keller are of particular relevance to higher education planners.[35]

Concluding Observations

As mentioned earlier, *kaizen* is an evolutionary Japanese philosophy wherein constant incremental improvements build from generation to generation. Another Japanese term, *ishinsuru*, means to revolutionize. Taken together, these two concepts—constant improvement and a predisposition periodically to revolutionize—form the basis for transformation or reengineering.[36] The broad outline for carrying out the process is delineated in literature that is specific to reengineering. Some necessary details must be filled in from more traditional bodies of literature related to organizational structure, culture, leadership, planning, and so forth. Unfortunately, not all of the traditional literature in these areas fits philosophically with transformation concepts and assumptions. Leadership, for example, must change from what traditionally has been, and continues to be, depicted in some of the literature.

This chapter has attempted to pull together references that present perspectives that do have common assumptions and are forward looking. Once begun, reengineering progresses in cycles of *ishinsuru, kaizen, kaizen, kaizen, ishinsuru, ...*, forever more. If any segment of higher education is to move toward a serious attempt to reengineer, more literature on this subject is needed. Hopefully, this synopsis will make a small contribution toward meeting that need.

Footnotes, Section 1:

[1] Shoshana Zuboff, *In the Age of the Smart Machine* (New York: Basic Books, Inc., 1988), p. 387.

[2] Thomas J. Sergiovanni, "Leadership and Preparing Educational Leaders," Mary Ann Alia Distinguished Lecture, California State University Los Angeles, School of Education, September 24, 1991.

[3] Michael Hammer, "Reengineering Work: Don't Automate, Obliterate," *Harvard Business Review*, July-August 1990, pp. 104-112; and Richard L. Nolan, "Too Many Executives Today Just Don't Get It!," *CAUSE/EFFECT*, Winter 1990, pp. 5-11.

[4] Shigeyasu Sakamoto, "Process Design Concept: A New Approach to IE," *Industrial Engineering*, March 1989, pp. 31-32.

[5] Michael Hammer, "Reengineering Your Business," AT&T Computer Systems Symposium, 2 April 1990.

[6] F. J. Purcell, "Taming of the Paperwork Monster," *Information Center*, June 1990, pp. 25, 27.

[7] Leonard L. Berry, Valarie A. Zeithaml, and A. Parasuraman, "Five Imperatives for Improving Service Quality," *Sloan Management Review*, Summer 1990, pp. 29-38.

[8] Leonard A. Schlesinger and James L. Heskett, "The Service Driven Company," *Harvard Business Review*, September-October 1991, p. 74.

[9] Nolan, pp. 10-11.

[10] Hammer, AT&T Computer Systems Symposium.

[11] Chris Argyris, *Overcoming Organizational Defenses* (Boston: Allyn and Bacon, 1990), pp. 7-11.

[12] Ibid, pp. 1, 11.

[13] Peter M. Senge, "The Leader's New Work: Building Learning Organizations," *Sloan Management Review*, Fall 1990, pp. 8-9.

[14] Ibid., pp. 8-9.

[15] Richard M. Cyert, "Defining Leadership and Explaining the Process," *Nonprofit Management & Leadership*, Fall 1990, pp. 32, 36.

[16] Sergiovanni, Mary Ann Alia Distinguished Lecture.

[17] Edgar Schein, "Coming to a New Awareness of Organizational Culture," *Sloan Management Review*, Winter 1984, p. 3.

[18] Peter S. Delisi, "Lessons from the Steel Axe: Culture, Technology, and Organizational Change," *Sloan Management Review*, Fall 1990, p. 86.

[19] Katy Koontz, "Six Ways to Motivate Your Staff," *Sourcebook*, Summer 1990, pp. 22-29.

[20] Senge, p. 9.

[21] Peter Block, *The Empowered Manager* (San Francisco: Jossey-Bass, 1987), pp. 20-24.

[22] Richard S. Wellins, William C. Byham, and Jeanne M. Wilson, *Empowering Teams* (San Francisco: Jossey-Bass, 1991), pp. 10-13.

[23] Howard S. Gitlow and Shelly J. Gitlow, *The Deming Guide to Quality and Competitive Position* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1987).

[24] Larry J. Ford, "Using Information Strategically: IBM Roadmap for the 1990s," IBM Customer Briefing, Beverly Hills, Calif., November 9, 1990.

[25] David A. Garvin, "Competing on the Eight Dimensions of Quality," *Harvard Business Review*, November-December 1987, pp. 104-108.

[26] Nolan, pp. 8-9.

[27] Paul S. Goodman, Lee S. Sproull, and Associates, *Technology and Organizations* (San Francisco: Jossey-Bass, 1990), pp. 248-249.

[28] John F. Rockart and James E. Short, "The Networked Organization and the Management of Interdependence," in *The Corporation of the 1990s: Information and Organizational Transformation* (New York: Oxford University Press, 1991), pp. 212-215.

[29] Ram Charan, "How Networks Reshape Organizations—For Results," *Harvard Business Review*, September-October 1991, pp. 104-105.

[30] Ibid., p. 106.

[31] Ibid., pp. 107-108.

[32] Schlesinger and Heskett, p. 76.

[33] Larry D. Rosen and Michelle M. Weil, "Computers, Classroom Instruction, and the Computerphobic University Student," *Collegiate Microcomputer*, November 1990, p. 281; and Larry D. Rosen, Deborah C. Sears, and Michelle M. Weil, "Computerphobia," *Behavior Research Methods, Instruments and Computers* 19, no. 2 (1987): 167-179.

[34] James I. Penrod and Thomas W. West, "Strategic Planning for Computing and Communications," *Organizing and Managing Information Resources on Campus*, (McKinney, Texas: Academic Computing Publishers, Inc., 1989), pp. 118, 136.

[35] Robert C. Shirley, "Strategic Planning: An Overview," *Successful Strategic Planning: Case Studies, New Directions for Higher Education*, No. 64 (San Francisco: Jossey-Bass, 1988), pp. 5-14; John M. Bryson, *Strategic Planning for Public and Nonprofit Organizations* (San Francisco: Jossey-Bass, 1988); and George Keller, *Academic Strategy: The Management Revolution in American Higher Education* (Baltimore, Maryland: Johns Hopkins University Press, 1983).

[36] James I. Penrod and Michael G. Dolence, "Concepts for Reengineering Higher Education," *CAUSE/EFFECT*, Summer 1991, p. 10.

2
Reengineering in Higher Education

◆ ◆ ◆ ◆ ◆ ◆ ◆

External forces are dramatically changing the public's aspirations and expectations vis-à-vis higher education institutions. And the system's perceived inability to respond effectively is seriously eroding public confidence.[37]

— Peter Smith

For almost three decades following World War II, higher education expanded to meet a national commitment to open access. Resources increased steadily, and the number of campuses grew from around 1,700 to over 3,000. However, beginning in the 1980s, things changed. A national public debate began over rapidly escalating college costs, a movement started to link student outcomes assessment to state appropriations, colleges were found lax in their oversight of federal financial aid and loan programs, states began to strain to keep their commitment to open access, and federal expenditures came under close scrutiny. Over the past year, two thirds of the states have reduced appropriations to higher education.[38] Clearly, events such as these are reshaping higher education. Together, they set a strategic context for academe as the 21st century approaches. The realization and acknowledgement of this emerging strategic context has prompted many higher education and political leaders to conclude that the postsecondary institutions that enter the next century will be dramatically changed from those we know today. In fact, few question that these institutions can flourish without decided change.

The reengineering paradigm holds significant potential to revitalize and reshape colleges and universities for the future, offering an effective response to three significant sociological factors:

First, there is a growing uneasiness among policy makers, parents, and students *regarding the increasing cost of higher education.* Costs, which for years have risen faster than the Consumer Price Index (CPI) or the Higher Education Price Index (HEPI), have led to a deep concern over the value returned on each higher education dollar invested. The root of this cost-versus-quality conundrum involves the relationship between academic productivity and costs. At one end, resource providers fear that costs have risen faster than the value of higher education's output. At the other end, educators fear that trimming costs by such measures as increasing the faculty-to-student ratio erodes quality and fails to recognize the value of higher education in developing human capital. These "quality scare" assertions, that any failure to provide adequate resources will result in immediate and irreparable diminution in the quality of education, are generally no longer convincing to resource providers. Furthermore, pressure to bring about increased productivity is steadily increasing.[39]

The price of higher education has begun to affect access. Many family budgets are strained beyond their ability to pay while, at the same time, state and federal expenditures exceed revenues, causing static if not decreasing funding for higher education programs.[40] This has led to such proposals as differential pricing of education where tuition and fees are set in accordance with student and family income. Regardless of the success of such proposals, the postsecondary community will continue to experience significant pressure to contain cost and increase quality by doing more with less. This strategic context for higher education establishes one inviolate rule: institutions must live within their means.

Second, there is *a strong need to respond to student consumerism.* As retail and business environments have had to increase the quality of customer service to stay competitive, they have established new levels of expectations for

college and university business and service functions. As institutions of higher education struggle for competitive advantage, they must examine new ways to compete and improve service and responsiveness. Increasingly, institutions are recognizing that administrative and bureaucratic functions, rules, and regulations can be eliminated with no corresponding diminution in quality of service or program. Competitive advantage grows from improvement, innovation, and change. It involves the entire value system of the organization. It can often only be begun if we break the mold with which we currently work. It can only be sustained through relentless advancement.[41]

Third, *rapid, far-reaching change is emerging as the dominant paradigm for entering the 21st century.* Change challenges virtually all of the paradigms of the industrial age, and colleges and universities must help lead the emerging global society through the evolutionary process to a new world order where pressing problems will be addressed. In doing so, colleges and universities must evolve into organizations that can learn to function effectively in a constantly changing environment. Certainly, the idea of creating a learning organization should not require a "hard sell" in a college or university. However, it is important to reemphasize that, despite the advantages higher education might have in undertaking such an effort, truly transforming a college or university will require significant commitment, consistency of action, and completely dedicated executive leadership with real vision.

The Organizational Culture in Academe

Massy describes the *complex spiral of the administrative lattice and the academic ratchet.* In his scenario, he indicates that, over the past fifteen years, administrative functions (the lattice) have grown far faster than academic functions. Between 1975 and 1985, administrative-type functions grew by 60 percent while the number of faculty grew by only 6 percent.[42] A number of factors have contributed to this rapid growth including increased regulations (OSHA, EEOC, EPA, FISAP, IPEDS, A21, OFCC), an expansion of entrepreneurship by administrators, and the overhead associated with consensus management. At the same time, the academic ratchet has moved faculty "away from institutional defined goals toward the more specialized concerns of faculty research, publication, professional service, and personal pursuits." Together the lattice and ratchet have exacerbated the cost of providing a higher education.[43]

Breaking the mold of the lattice and ratchet is not an easy task. March and Simon have characterized colleges and universities by the organizational model of decision-making. This model consists of a network of semi-autonomous small units existing within a large organization. Each unit is primarily responsible for a limited number of specific tasks and functions within a fixed set of procedures.[44] Few large-scale decisions can be made; rather, decisions work through each network and unit by prescribed procedures. The result is small, incremental changes which are less disruptive to the status quo. This "disjointed incrementalism" fosters decision-making that nurtures parochial priorities and perceptions and limits change.[45]

For this reason, increasing productivity within academe is not an easy undertaking. Many institutions grappling with the complexity of this issue have set forth a philosophy of growth by substitution. Substitution means reallocating resources from one program or project to another. The growth by substitution strategy, however, flies in the face of the prevalent historic academic philosophy: "Any service we offer, must be offered in perpetuity." The perpetuity hypothesis reasons that services and their supporting rules, regulations, and policies, once established, are immortal. When coupled with a segmented organizational structure and decision processes typical in higher education, programs, services, and bureaucratic procedures can indeed approach untouchable status, and change can be severely limited.

New Paradigms in Higher Education Administration

However static higher education may appear, a number of new paradigms have emerged over the past decade in response to the new strategic context confronting postsecondary institutions. These new paradigms are important because they show both a willingness and the strategic intent to address the challenges presented by changes in the environment. Among the most important ones are the advent of strategic planning systems, the development of integrated information resources management programs, the evolution of strategic enrollment management principles, and the application of the principles of total quality management. None of these has become a pervasive movement in higher education, but they are excellent examples of ways in which some institutions have addressed the need for change.

Strategic planning systems first appeared in the business/industry arena to help companies become more competitive. They have been slowly adopted by the not-for-profit sector and higher education. John Bryson defines strategic planning within the not-for-profit context as a "disciplined effort to produce fundamental decisions and actions shaping the nature and direction of an organization's activities within legal bounds."[46] The planning legacy in higher education has been fraught with disappointment, frustration, false starts, and abandoned processes. The literature suggests that these travails result from a mismatch between the processes developed in the business environment and their application in academic environments. Fortunately, new strategic planning systems and methodologies have evolved in higher education with some success. Rather than the detailed, quantitative efforts of the past, they are agreed-upon visions of the future with strategies for success. As such, they are important to the success of reengineering because the process helps sharpen the service focus of the organization, clarifies the strategic intent and direction of the institution

and its major units, and establishes the nature of expectations.

Information Resources Management (IRM) emerged in the 1980s as an institution-wide information management strategy. Key to the IRM approach is a recognition that information is an organization-wide resource that is critical to the institution's achieving its mission. An IRM organization is expected to provide leadership on technological issues, coordinate and integrate technology initiatives, and formulate information technology policy. IRM entails the management (planning, organization, operations, and control) of the resources (human, financial, and physical) concerned with supporting (developing, enhancing, and maintaining) and servicing (processing, transforming, distributing, storing, and retrieving) information (data, text, images, and voice).[47]

IRM organizations are historically composed of diverse units such as data communications, administrative computing, academic computing, voice communications, planning, television service, institutional research, printing, mail service, copying/reprographic services, media services, and the library. A primary focus of the IRM approach is the development and operation of an integrated information technology infrastructure that enables new levels of communication, cooperation, functionality, and service. It is exactly this enabling infrastructure that facilitates and helps drive the process of redesigning processes and procedures of the institution.

Strategic enrollment management has emerged as a cohesive campuswide focus on ensuring that the institution will continue to enroll the number of students necessary to survive through the next decade. It is defined as a comprehensive program designed to achieve and maintain the optimum recruitment, retention, and graduation of students where "optimum" is defined within the academic context of the institution.[48] For some institutions, the word "attainment" (achievement of a degree or non-degree objective) may be substituted for the term "graduation" (receipt of a degree).[49] Within this context, *recruitment* is defined as the active process an institution undertakes to favorably influence a student's decision to attend, and retention is defined as the maintenance of a student's satisfactory progress toward his/her pedagogical objective until it is attained. Recruitment, then, focuses on the pre-enrollment decision processes, and retention focuses on post-enrollment decision processes.

This comprehensive approach is designed to aggregate formerly disaggregated processes, policies, and procedures. It is intended to achieve synergies between recruitment and retention strategies. Generally, a seamless and significantly improved service environment is sought to provide maximum support of institutional academic and enrollment goals. At the heart of strategic enrollment management is information, not just data. Enrollment management professionals must be able to describe and track students interested in the institution, applicants, matriculants, and even graduates. They must be able to identify students in trouble and intervene in a meaningful way before they drop out. They must be able to provide service levels that make their institution competitive. Strategic enrollment management relies upon, even demands, that service processes, functions, and support systems be reevaluated, redesigned, and reimplemented under drastically different performance and operational parameters. In other words, they need to be reengineered.

Total Quality Management as it is applied in higher education involves five basic points, according to Ellen Earle Chaffee.[50] The first is *customer focus.* There are internal customers such as students, staff, or other academic or administrative units; and there are external customers including taxpayers, parents, alumni, donors, and outside agencies. Customer focus means meeting the customers' real needs. The best way to do that is by asking how their needs might be better met—and then doing it.

The second point is the *systematic improvement of operations,* which involves applying the scientific method to work. That is, spending an adequate effort to understand the cause of a problem, collecting data on it, using the data to derive potential solutions, trying a selected solution in a limited way, and checking to see if it worked or if it needs modification. Finally, when it is clear that the solution works, it must be applied wherever it is relevant.

Third is *developing human resources.* College and university administrators need to recognize that most performance problems are caused by the system, not the employee, and that the person doing the job is the only one who can improve job performance. Often, people lack three initial components for effective performance: (1) they may have had little training in how the organization expects them to perform or in how their job fits into the organization, (2) they may have had no training in how to make changes to improve job performance, and (3) it may be that the organization discourages them from attempting change. Management must ensure adequate training and retraining to create an environment in which people can do effective work.

Long-term thinking is the fourth point. Too often colleges and universities focus on immediate deadlines, details, and short-term results rather than taking a long-term perspective. It is important for all to understand the "big picture" and for small, solid, continuous improvements to be rewarded.

Fifth is a firm *commitment to quality.* Every institution speaks of quality. However, in almost every institution there are people and processes well known for tolerating inadequate results. Demonstrating a commitment to quality requires that inadequacies be addressed. This may mean immediately fixing an obviously poor process or investing time and effort to improve something that works but that can be made more effective.

TQM is synergistic with the fundamental principles of transformation and is a very valuable tool in the reengineering process. By focusing upon building a quality culture based on individual responsibilities, institutions can prepare themselves for the true benefit of reengineering—breakthrough thinking and achieving magnitudes of change in productivity and performance.

These concepts are examples of some of the new paradigms that have emerged which may help dismantle the lattice and the ratchet and facilitate institutional health and growth within this new strategic context. These paradigms have several things in common: they are institutional in scope; they accommodate or address major changes in the environment; and they rely upon strategic information for success. The process of transformation would not only accommodate these management innovations, but would strengthen them. As an institutional strategy, reengineering seeks not only incremental increases in performance, but also magnitudes of change.

Dynamics of Organizational Growth

A valuable tool in approaching reengineering is familiarity with the dynamics of organizational growth and change. Henry Mintzberg offers a useful model, describing the forces and forms of effective organizations in terms of the interplay between five forces—proficiency, direction, efficiency, innovation, and concentration—linked with organizational types, and two other forces—cooperation and competition—that come into play in all organizations (see Figure 1).

In reality, no single organization is any one of these five organizational types in pure form, nor is any one of these dynamic forces present to the exclusion of the others. By and large, all are present to some degree and exist in dynamic equilibrium. This does not mean, however, that they all exert equal force; in most organizations one or more of these types and forces characterize the nature of the enterprise. Mintzberg calls this the organization's *configuration.*

It is unlikely that a university will have one dominant configuration. The finance office, for instance, might be classified as a machine, research-oriented academic units might be adhocracies, many other academic units could be professional, and the president's office would be entrepreneurial.

In organizations that have a dominant configuration, there is a sense of order, internal consistency, integration—and perhaps even synergy among processes. This also makes it easy for "outsiders" to understand the organization. Similarly, organizations with a strong ideology have a force for cooperation in the institution and can develop good collegiality and consensus. People pull together for the common good. There are notable examples of colleges and universities with such distinctive characters.

More commonly, however, colleges and universities are combination organizations without a strong ideology, and with significant internal competition and lots of politics. The catalytic forces of ideology and politics are contradictory forces that must be reconciled if an institution is to be effective in the long run. The process of transformation or reengineering, with its emphasis on examining assumptions, rejecting conventional wisdom, looking for ways to initiate change , and creating learning organizations, offers a promising methodology to achieve this reconciliation.

Mintzberg notes that very few organizations spend their entire lives in one configuration or combination. As the environment changes and the needs of organizations change, they must undergo *conversion* from one form to another. Institutions highly dependent on expertise, like universities, usually move down the right side of the pentagon represented in Figure 1. For conversion to take place, the balance between ideology and politics must change, bringing about new strategy, structure, or form.

Reengineering for a Learning Organization: Critical Success Factors

Colleges and universities are institutions of learning, and those in the United States are generally regarded as the best in the world. However, the time has come when we must ask whether U.S. colleges and universities are truly learning organizations—communities of people continuously expanding their capacity to create desired results (see footnote 21, Section 1). The transformed organization of the 21st century will be a learning organization, of which one of the principal purposes will be the expansion of knowledge. This will not be knowledge for its own sake, as in academic pursuit, but rather knowledge that resides at the core of productivity in a global economy and world society. Learning can no longer be a separate activity that occurs before one enters the work place or in classroom settings. It cannot be an activity preserved for managerial or elite technical groups. The behaviors that define learning and those that define being productive have come to be one and the same. Learning is the heart of productive activity, the new form of labor that is now building the "empires of the mind."

The following factors are key to the successful reengineering of campuses into learning organizations.[51]

- *Recognize the need for broadbased, institution-wide change to achieve new levels of strategy, commitment, and service.*

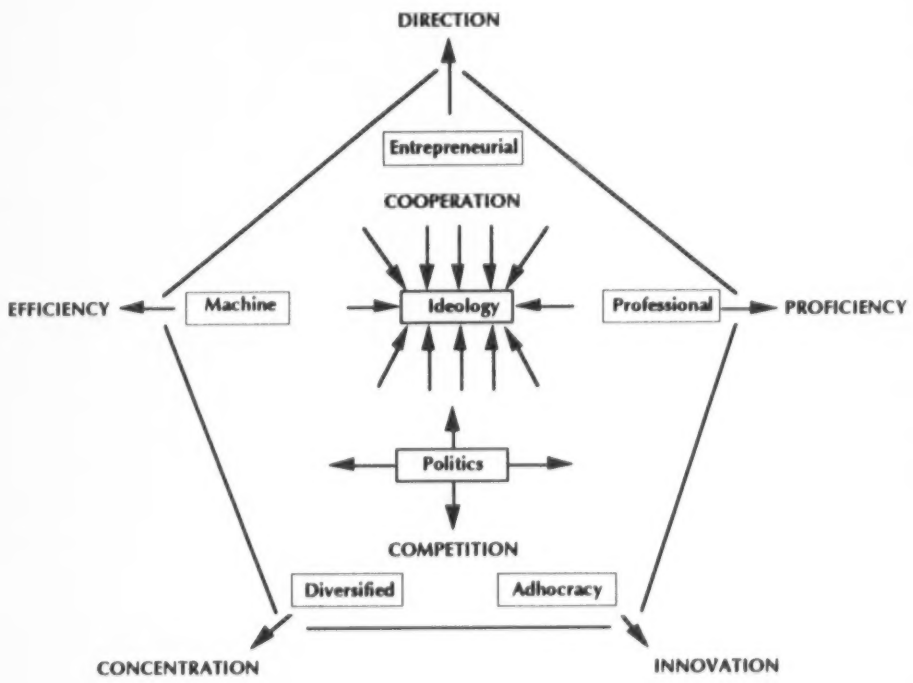
We believe that this is not a generally held perspective and that, even where it is, some "initiating spark" will probably be needed to overcome organizational entropy for any serious consideration to be given to reengineering. That spark might come from a crisis, a new leader, or an external person or event. The time must be right, however, for the spark to ignite.[52]

- *Set forth a well-articulated information strategy that is synergistic with institutional decision-making.*

This is not a glorified information systems plan, but a strategic direction set forth by executive leadership that recognizes information as a critical resource. The ability to use information immediately in decision-making and access by all levels of the organization should be recognized as fundamental components of acceptable service.

Figure 1

A SYSTEM OF FORCES AND FORMS IN ORGANIZATIONS



Proficiency is the force that drives the high skill/knowledge task orientation. Highly proficient organizations have a professional organizational style: experts operate with the autonomy of skilled practitioners along predetermined paths. *Direction* is the strategic vision or awareness of where the organization is going. Organizations with strong directive force are entrepreneurial in nature. The force of *efficiency*, driven by cost/benefit analysis, leads to an organization which Mintzberg likens to a machine. Such organizations are highly structured and tightly controlled through rules and regulations. *Innovation* is the force that leads organizations and their members to discover or invent new things. Here the rule is creativity, and the dominant organizational style is one of an adhocracy. *Concentration* is the need to focus on key products or services. In organizations where concentration dominates, the first priority is to diversify into specialty units, then create divisions focusing on the product or service. The organizational style is diversified.

Two other forces come into play in organizational dynamics. The force of *cooperation*, driven by ideology, creates the desire to work with other organizational members and units because it is good for the organization. Ideology underpins this force by creating a set of common beliefs, values, and goals that are broadly understood and individually internalized—i.e., an organizational culture. *Competition* is the force that creates friction over priorities or resource allocations within the organization. Competition is often driven by politics. These political activities are not formally sanctioned and are often conflict oriented.

This figure and related material are drawn from Henry Mintzberg's "The Effective Organization: Forces and Forms," Sloan Management Review, Winter 1991, pp. 55–63. Reprinted with permission of the publisher.

The campuswide information technology strategy should address the following kinds of issues: (1) the rationale for a campuswide network for voice, data, video, and image transmission which links to regional, national, and international networks; (2) the nature and architecture of the corporate database; (3) the institutional stance on standards; (4) the manner in which scholarly access to information will be addressed; (5) the definition of IT support mechanisms; (6) the institutional, school, department, and individual roles and responsibility areas for IT; (7) policy for such things as privacy, security, intellectual property rights, and so forth, and (8) the methods of access for executives, knowledge workers, and front-line operations personnel (is there an executive information system? a decision support system?). Obviously, such a strategy will require the IT plan to be integral to the institutional strategic plan.

- *Develop a critical mass of innovative leaders and information technology infrastructure*

Making rapid, major changes in the comfortable elements of the work environment is not easy for anyone, yet that is exactly what reengineering requires. Thus, innovative individuals capable of handling the change and helping others to do so must be in place during the transformation. An existing information technology infrastructure capable of supporting and sustaining the transformation is also necessary.

An executive level chief information officer (CIO) or an IT champion among the executive officers (perhaps the chief operating officer or the provost) is needed to provide necessary policy level coordination and direction. Mid-level managers across the campus who are willing to become leaders and change agents must be identified.

The infrastructure must minimally include an all-purpose, campuswide network with an upgrade path; a corporate database with wide access capability; support for knowledge workers of all types; access to scholarly information; and competent technicians and application specialists in a variety of areas across the institution.

Additionally, information technology systems design must reflect the reengineered environment. This will occur in many ways; the following examples are illustrative rather than exhaustive. An open systems model is important, as are widely communicated and agreed-upon standards. The design must support broadbased access to all organizational levels and varied constituencies with either the need or the right to know. Integrated relational database management systems (that are truly distributed when possible) coupled with state-of-the-art development and inquiry tools will be a necessity. The fundamental design criteria must change from a basic focus on *functionality* for the primary application specialist to *support* for the corporate executive, the primary application specialist, and ultimate clients—faculty and students. This has ramifications for all levels of software, hardware, and networks.

- *Be sure that the information technology staff understand and support the vision.*

It is all too possible to have an IT infrastructure capable of supporting reengineering but not have IT managers and technicians with the same capability. "Pride of ownership," "This way has always worked," or "If it ain't broke don't fix it" attitudes simply will not mix with a transformation orientation. Information systems professionals must be in the forefront of any reengineering endeavor, and they must begin within their own units. The next section of this paper looks specifically at actions that might be needed in those units.

- *Gain acceptance of a holistic approach to resource allocation.*

A primary reason to engage in reengineering is to achieve productivity breakthroughs. Positioning an organization to enable transformation, however, will involve considerable time, energy, education, and expense. By and large, the expenditures will have to come from existing resources, which means eliminating unnecessary commitments. The institutional focus must be upon mission and the long-term good of the organization rather than nonaligned unit goals and short-term perspectives.

It is imperative to educate as many key players as possible, as quickly as possible, regarding the following issues: the environmental forces which indicate the need to reengineer; the long-term benefits to the institution, academic and administrative units, groups, and individuals; the potential negative results of failing to transform; the principles of the reengineering process; and expected contributions by units to enable transformation.

- *Create an organizational structure that will enable the institution to become a learning organization.*

Metaphors such as a symphony, an adhocracy, a permeable membrane, a collapsed pyramid, and a spider's web have been used to describe structures that will replace bureaucracies. Whatever descriptor prevails, the new organization will have fewer levels, better communication channels, quicker decision-making mechanisms, an outcome orientation, and more flexibility. It will combine the benefits of both centralization and decentralization. A major premise of networked institutions is that an information infrastructure permits more effective management of organizational interdependence, which enhances concurrent effort along multiple dimensions of the organization.

Knowledge workers in such an organization will need to be team-oriented, interdisciplinary, able to handle greater role complexity and looser lines of authority. Zuboff notes that managerial activity will need to concentrate on four principal domains: intellective skill development, technology development, strategy formulation, and social system development.[53]

- *Design an entrepreneurial organizational culture.*

Basically this is a recognition that institutions of the future will produce, learn, communicate, innovate, and behave only as well as the sum of the organizational participants. An orientation on values and a focus on the importance of the person must be evident. Objectives of the organization, the group, and the individual must be carefully aligned and coordinated.

Creating empowered teams is a primary way to gain the desired alignment, coordination, and innovation. Effective teams are composed of committed individuals who trust each other, have a sense of purpose about their work, are effective communicators within and outside of the team and include other team members in decisions affecting the group, and carefully follow a process that helps in planning, making decisions, and ensuring the quality of their work.[54]

- *Make a commitment to examine, reorient, and redesign all policies, procedures, and position descriptions to emphasize outcomes.*

The magnitude of change discussed in the literature points to a complete overhaul of standard operating processes and reallocation of emphases. Leadership intervention may cause a change of focus for a while, but permanent change to embrace the principles of a learning organization requires very different standard operating procedures.

The scope of reengineering should focus on extended processes, not just on activities with boundaries established in the past. Fundamental assumptions on which processes have been based should be identified and, if necessary, recast. Where change is restricted by stated policy, the policy should itself become the subject of attention. Technology should be a shaping influence in this endeavor, not just an implementation tool. It should be recognized that certain elements of the organization are inherently stifling, and that administrative units of today must be capable of embracing, encouraging, and managing change. This may result in recommendations regarding organizational makeup and flexibility, coordination and cooperation between units, and redefinition of certain jobs.

Four guidelines are key to this review of work flow and job descriptions: (1) the organization of work should be built around and focus upon outcomes, not tasks or department or unit responsibilities; (2) individuals should be empowered and held accountable, with decision-making defined as part of the job; (3) accountability and process control must be built into the work flow and not be an extension to it; and (4) the details required to support maintenance of the basic infrastructure must be meticulously addressed.

- *Develop new metrics for measuring quality, accounting, and performance.*

Quality has long been measured in higher education by comparisons with peer institutions or against a set of standards defined by professional organizations such as the National Association of College and University Business Officers, American Association of Collegiate Registrars and Admissions Officers, and others. Traditional accounting standards have evolved from the industrial economy model but are now woefully inadequate in measuring productivity in a knowledge worker environment. Performance measurement is typically a top-down process focusing on the tasks of a position description.

As quality begins to be judged according to six-sigma goals, very different measurement criteria will be needed for processes in which errors can be detected and counted. As electronic access to information over networks increases new standards will need to be developed to measure such things as the quality of an academic library. Accrediting agencies have begun to assess the quality of the IT infrastructure as part of their criteria, but far more needs to be done. Many current standards relate to ratios per full-time-equivalent student. Clearly the very nature of a transformation to an information/service economy will make most of these obsolete.

An information/service economy needs an accounting framework that can identify which activities add the most value, enabling organizations to distinguish between routine and creative tasks. Only then will the costs of technology acquisition and knowledge worker hiring be evaluated accurately in the context of an institution's strategic objectives and competitive realities. Activity-based managerial accounting may be a step in the right direction, but much more work in this area remains to be done.[55]

Reengineering affects performance measurement in several ways. Assessing the performance of tasks must be reoriented toward accomplishment of outcomes. As networks and empowered teams are formed, additional performance criteria must relate to contributing to the success of a team. Some consideration should be given to taking the appraisal process out of a one-on-one context and putting at least some segment of it in a group context where team members rate each other on contributions to the whole team. Careful thought must be given to the interpersonal dynamics of the group when this is done.

- *Emphasize different leadership characteristics.*

Vividly articulating a shared vision is crucial to reengineering. It is an ongoing process that requires leaders to continually share their own vision with their organizations and ask, "Is this worthy of your commitment?" Although fear is a powerful short-term motivator, aspiration must endure as the continuing source of learning and growth. The shared vision, therefore, needs to be powerfully positive. Balancing inquiry and advocacy are important skills for leaders of learning organizations; they need to do both well. Transformation leaders must be able to discern between espoused theory and the theory that individuals really put into practice, and they must be able to defuse defensive routines. Leaders of the future must be able to see interrelationships and not focus on detail. They must avoid symptomatic solutions and be able

to move beyond blame. Additionally, such skills must go beyond a few individuals at the top of the organization. They need to be distributed widely throughout the institution.[56]

Summary

Higher education must find an acceptable response to the pressures of increasing costs, flat or decreasing funding, heightened constituent expectations, and reaction to rapid environmental changes. Colleges and universities must break the mold of the administrative lattice and academic ratchet. New paradigms such as strategic planning systems, IRM programs, strategic enrollment management, and total quality management programs are encouraging beginnings but are unlikely to bring the overall response that is needed.

The reengineering process offers a context for a thorough reexamination of the assumptions about the way things are done in higher education. It can easily encompass and enhance the new paradigms which are already under way. A commitment to true transformation will require institutional analysis far more critical than that required by an accreditation visit, resource redistribution more extended than any caused by fiscal crisis, and broadbased restructuring beyond any resulting from a systems merger. However, even results which are moderate by reengineering standards can be far reaching, and almost assuredly will have as much impact on academic endeavors as on administrative functions.

In considering a transformation commitment, we must understand the consequences of maintaining the status quo while the world around us changes. Unless colleges and universities significantly shift their modes of administration, the confidence of our constituents and the general public will in all probability continue to erode, financial pressures will continue to build, resulting in a real loss of quality, and the future leaders of our society will not be educated as well as they might be to cope with the challenges of the 21st century.

Reengineering requires "thinking big," extraordinary commitment, and absolute dedication to the accomplishment of organizational mission. It is not a consideration for the timid, but it could well be a path for maintaining the most successful system of higher education in the world.

Footnotes, Section 2:

[37] Peter Smith, "Beyond Budgets: Changing for the Better," *Educational Record*, Spring 1991, p. 26.

[38] Mary Crystal Cage, "30 States Cut Higher-Education Budgets by an Average of 3.9% in Fiscal 1990-91," *The Chronicle of Higher Education*, 26 June 1991, p. 1.

[39] William F. Massy, "A Strategy for Productivity Improvement In College and University Academic Departments," presented at the Forum for Postsecondary Governance held in Santa Fe, N.M., October 31, 1989.

[40] Mary Crystal Cage, p. 1.

[41] Michael E. Porter, *The Competitive Advantage of Nations* (Glencoe, Illinois: Free Press, 1990).

[42] The data were originally reported by Karen Grassmuck in an article which appeared in the March 28, 1990 issue of *The Chronicle of Higher Education*. This source is quoted by William F. Massy in "The Lattice and the Ratchet," The Pew Higher Education Research Program, *Pew Policy Perspectives* 2 (June 1990): 2.

[43] William F. Massy, "The Lattice and the Ratchet," The Pew Higher Education Research Program, *Pew Policy Perspectives* 2 (June 1990): 1-8.

[44] J. G. March and H. A. Simon, *Organizations* (New York: Wiley, 1958); J. G. March, ed., *Handbook of Organizations* (Chicago: Rand McNally, 1965); and H. A. Simon, *Administrative Behavior* (New York: Macmillan, 1957).

[45] D. Braybrooke and C. E. Lindblom, *A Strategy of Decision* (Glencoe, Illinois: Free Press, 1963).

[46] John M. Bryson, *Strategic Planning for Public and Nonprofit Organizations* (San Francisco: Jossey-Bass Publishers, 1988), p. 5.

[47] *1991/92 Strategic Plan for Information Resources Management*, California State University/Los Angeles, p. 1.

[48] Michael G. Dolence, Derek H. Miyahara, John Grajeda, and Christopher Rapp, "Strategic Enrollment Management and Planning," *Planning for Higher Education* 16, no. 3 (1987-88): 55.

[49] Michael G. Dolence, "Evaluation Criteria for an Enrollment Management Program," *Planning for Higher Education* 18, no.1 (1989-90): 1.

[50] Ellen Earle Chaffee, *Total Quality Management: A Guide to the North Dakota University System 1991-1992*, Publications Services Office, North Dakota State University, 1991, pp. 16-19.

[51] Penrod and Dolence, "Concepts for Reengineering Higher Education," *CAUSE/EFFECT*, Summer 1991, pp. 16-17.

[52] For a discussion of ten organizational conditions that are necessary before an institution can embark on a major change effort, see Ralph H. Kilmann, Teresa Joyce Covin, and Associates, *Corporate Transformation: Revitalizing Organizations for a Competetive World* (San Francisco: Jossey-Bass Publishers, 1988), pp. 92-94.

[53] Zuboff, Shoshana, *In the Age of the Smart Machine* (New York: Basic Books, Inc., 1988), p. 398.

[54] Wellins, Byham, and Wilson suggest that it takes progression through four stages before trust, purpose, communication, involvement, and process orientation are effectively solidified.

[55] Stephen S. Roach, "Services Under Siege—The Restructuring Imperative," *Harvard Business Review*, September-October 1991, p. 91.

[56] See Senge, pp. 13–15, for a discussion of skills needed in the three critical areas of building shared vision, recognizing and challenging mental models, and systems thinking.

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3
Implications of Reengineering for Information Technology Units

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Either address change and take advantage of the unique opportunity it offers for you to successfully serve your enterprise, or face consequences that can range from the loss of your organization's important role in the enterprise to the loss of your job....Of course, other challenges face you and your enterprise ... but in light of the current acceleration of change ... and its potential impact on IS careers, this particular challenge must take priority.[57]

— Mario M. Morino

As new types of IT organizations evolve, broadbased "buy-in" becomes a reality, campuswide needs and expectations grow, and—in the midst of major infrastructure projects—new solutions to resource issues and institutional necessities must be found. The following scenario is based on real-life events at The California State University/Los Angeles, a state-supported, urban, comprehensive university. What is happening at CSU/LA is not atypical of what is happening at many institutions, especially public colleges and universities.

In 1985, CSU/LA committed to build an information technology infrastructure to support its instructional, research, administrative, and public outreach missions. In 1986, substantial resources were allocated for instructional support purposes. In the following five years, on-campus labs and electronic classrooms increased from four to thirty-seven, and personal computers for faculty grew from fewer than fifty to over 350, about one half of all full-time professors.

In 1987, the University installed a new mainframe computer and began installation of the first of four administrative systems eventually to be integrated in a relational database. Since then three of the four systems have become operational. The mainframe has gone through planned upgrades and is now state-of-the-art technology with enough power and capacity to support the integrated relational database. The first system to come up in 1988 has migrated to the relational environment, and the others are scheduled to follow within the next 18 to 24 months.

1988 also saw the installation of a campuswide fiber optic network, a digital PBX, medium-speed and high-speed data switches, a voice mail system, and a network management system. Many local area networks have been connected to the backbone, including almost all instructional labs; about 500 individual personal computers now have access and over 700 voice mail boxes have been added.

This infusion of information technology began as state support was becoming more difficult to obtain. Throughout the decade of the 1980s, the proportion of state budget allocated to higher education shrank. The first two fiscal years of the 1990s have seen net decreases in the institutional budget. In 1990-91, the campus IT budget was reduced by $900,000 and in 1991-92 by an additional $1.1 million from the original base of $11 million.

Despite these facts, the need for additional education and training continues to grow, network management becomes ever more critical and complex, additional support is needed in both the integrated administrative arena and the highly specialized, distributed academic areas; yet the budget situation has forced half a dozen layoffs, another eight

vacant position are "frozen," and expenditure levels in all categories are reduced. The necessity for change is no longer theoretical!

Can We Survive?

These circumstances tend to reinforce the arguments presented for transformation or reengineering in the early sections of this paper; however, given the magnitude of change coming from all directions, we must address the question, "Can we survive?" Morino offers five recommendations, on which this chapter is based, to help IT leaders answer the question of survival and to outline a possible path to successful reengineering. They are: (1) to promote the development of a positive-thinking, opportunity-oriented culture in the IT unit and beyond; (2) to establish total linkage between the IT strategy and institutional mission; (3) to arm oneself with information and become a knowledge seeker and technology transfer agent; (4) to communicate within the IT unit and to the entire institution; and (5) to provide solutions now without waiting for new technology.[58]

Develop a Positive-Thinking, Opportunity-Oriented Culture

It is up to the IT leadership to instill an entrepreneurial attitude that views change as opportunity and a "can-do" spirit into staff members, then to see that these ideas become cultural values. Such leaders will need to play multiple roles of designer, teacher, and steward to bring this about. Sergiovanni suggests that this can be done through certain stages of leadership, which unite leaders and followers in pursuit of common higher-level goals. The stages can be used simultaneously for different purposes or with different people—to deal with a recalcitrant individual never able to move beyond the first stage, for example.[59]

- *Stage One: Leadership by Bartering*

Leaders strike a bargain with followers where something is provided to the followers that they want in exchange for something the leaders want. This might be as basic as defining service levels that stress quality, timeliness, courtesy, and professional conduct, then evaluating performance and providing appropriate rewards for meeting the standards. It might involve providing education and training to staff members willing to learn and try new ways of approaching a given circumstance, i.e., becoming members of a matrix management group to solve ongoing problems, or joining a quality management team to improve the output of some error-prone process.

- *Stage Two: Leadership by Building*

Leaders provide the climate and interpersonal support that enhances followers' opportunities for fulfilling their needs for achievement, responsibility, competence, and esteem. This stage focuses on empowering individuals and developing self-directed work groups, and involves helping individuals recognize their own autonomy and assume responsibility for their actions. It also offers challenge, greater participation, and the opportunity for accomplishment through inclusion in work groups.

Areas that might readily benefit from such an approach are: (1) network groups which bring together voice, data, and video personnel to focus on architecture and network management issues; (2) programmer teams that bring together individuals responsible for the corporate database with those who develop front-end applications for the desktop; (3) database administration and data administration representatives charged with examining system architecture from the perspective of security, efficiency, and internal operations, and reliability, accessibility, performance, and conformance; or (4) groups made up of academic computing, library, and media staff to deliver better instructional support.

- *Stage Three: Leadership by Bonding*

Leaders and followers develop a set of shared values and commitments that bond them together in a common cause. Finding shared values in a higher education community is not difficult. The large majority of people who work in the environment do so because they believe that the future of our nation lies in an educated populace, that their work contributes to the greater good and is therefore meaningful, that the nature of their work enables them to continue to learn and to grow, and that it is easier to build trust in this work environment than it might be elsewhere. Additionally, most IT knowledge workers find the technology challenging and interesting, and believe that an IT infrastructure will enable the institution to progress and that their specific area of expertise is requisite to the IT infrastructure.

To solidify the desired bonding, leaders need to emphasize their moral commitment to these same values, and their appreciation of followers' contributions to unit and institutional goals.

- *Stage Four: Leadership by Banking*

Leaders institutionalize improvement gains into the everyday life of the organization to ensure that they become part of the culture. This requires turning the improvements into routines that become second nature and are passed on to others—i.e., the values are "banked." This means new policies and procedures which reflect empowered people, and a focus on client/customer service, new job descriptions emphasizing outcomes rather than tasks, and ongoing education/training both in technical areas and in methods to improve teamwork, decision-making, participation techniques, etc. And it demands that the values be instilled in new members of the organization. The introduction should include an orientation and frequent, early follow-up to ensure that the new member understands the values, why they exist, and the resultant individual and organizational expectations.

Building networks designed for superior execution in the volatile environment of the 1990s provides another means of institutionalizing and fostering support for an opportunistic

organizational culture. Certain types of networks might prove particularly useful in an IT organization coping with transformation. First, a network of IT managers could be charged with allocating pooled resources across the various departments that make up an IT unit. Such pooled resources might include professional development funds, money for internal departmental equipment, or the responsibility for assigning new positions or cutting existing ones in difficult times. Delegating decisions of this nature to a network of managers encourages the rapid development of a functional social architecture, maturation of professional trust, and a broadened understanding of organization-wide specifics of how the unit functions.

Second, a network of managers and technical specialists might be brought together to develop recovery processes for system failures. All members of the network, along with appropriate senior management, would be notified immediately through urgent voice mail and/or electronic mail when a system failure occurred. The network would be responsible for issuing a system impact report to the affected constituency specifying the problem, estimated time for resolution, and individual(s) primarily responsible for implementing the solution. The report should be issued within minutes of the initial failure after network members have identified the problem, outlined actions to be taken, and agreed upon parties charged with carrying out the actions. The network would monitor progress and provide updates if needed until the system was again fully functional.

Finally, a network of IT managers, IT knowledge workers, application area managers, and application area specialists could be given the responsibility for operating an integrated, networked system, e.g., a student information system or an advanced technology laboratory. Again, voice mail and/or electronic mail would be heavily used to simultaneously advise all network members of coordination needs, trade-offs, and decisions required to allow such systems to function smoothly. The network would identify shortcomings, specify and prioritize needed modifications, and alter procedures when necessary.

Almost everyone wants to be successful and most will work hard to be so—even in difficult times. Humans are designed for learning. An organizational culture that stresses hard work and encourages learning and the application of new skills can be a powerful force for transformation. IT leaders must strive to develop an organizational culture with such characteristics.

Establish Linkage Between IT and the Institution

A firm link between institutional and IT initiatives is an absolute prerequisite to any reengineering effort and is badly needed in any enterprise. The need for such a link is one aspect of the rationales for chief information officer positions, which now exist at approximately 300 colleges and universities. Typically they are at the level of vice president/vice chancellor or assistant/associate vice president or vice chancellor. The best linkage is made possible where the CIO is a member of the president's/chancellor's council.

In institutions that do not have a CIO or where the CIO is not part of the policy group, a "champion" must be found—someone who is a policy level officer and who understands the need for an IT/institutional linkage. Chief operating officers such as provosts or executive vice presidents are the best candidates for the champion role.

Simply having a CIO or a champion for IT at the policy level of an organization does not guarantee linkage: meaningful participation in IT decision-making at all institutional levels is necessary. Nonetheless, participation must begin with the executive officers. A primary function of a CIO or champion is to see that the use of technology to meet campuswide strategic needs is discussed and understood by the policy group and that such discussions become routine.

Mid-level managers throughout the institution should not only be involved in decision-making concerning institutional initiatives formulated by the IT unit but, more and more, must be given the authority and accept the responsibility of managing their own technology. For example, such mid-level managers may include registrars, directors of admissions and financial aid, and directors of accounting, accounts receivable, and accounts payable. These managers must be aware of and support the need to link IT and institutional initiatives. Part of their responsibility, then, is to ensure that the technology in their department serves the institution as well as the unit. Assuring the required coordination and cooperation of mid-managers across the organization is another primary function of a CIO or champion.

Supervisors and front-line knowledge workers must also be included in IT decision-making. These individuals need to understand how what they do fits into the larger system and how their part contributes to institutional mission. They can then be far more useful in suggesting ways to improve front-line service and, perhaps, how to better meet other institutional needs. An example of this might be determining how to design a form to collect a data element needed by another department, but best collected with other data by a unit that will not use it. Allowing a front-line worker even a small role in deciding how the element is captured and providing understanding of its importance to others contributes to the likelihood that the element will be better collected and maintained.

Perhaps the most visible function of a champion or CIO is to align IT goals with institutional mission through strategic planning and management. It is imperative that comprehensive IT strategies support both the academic and administrative functions within the institution. The teaching, research, and academic administrative functions must be integral to the reengineering effort. Deans, associate deans, department chairs, and individual faculty must be integral to the planning equation and their needs addressed in institutional IT strategies. This may best be done where there is an organizational strategic plan and directly linked campuswide tactical plans, one of which is an IT tactical plan. In this model, the IT tactical plan will define campuswide parameters for carrying

out institutional strategies. It is important to emphasize that the IT tactical plan should apply to all units, not just the IT unit. If a campuswide process does not exist, the champion or CIO must initiate the development of an IT planning process. It should be guided by the IT unit, but the resultant plan must encompass the entire institution.

Finally, the champion or CIO should nurture networks consisting of individuals from all organizational levels designed to continually strengthen the IT/institutional linkage. These could take several forms. One seemingly simple but potentially effective network would include the executive officers or the CEO's policy council. The social architecture of this group forms naturally, but it is important to persuade them to use electronic means to augment their communication. For urgent circumstances, an intercom connection between all members of the policy group should be set up. Since most digital PBXs allow multiple intercom groups and executive officers have an affinity for using the telephone, this link should not be difficult to establish. Where all members need to receive the same short messages simultaneously, a voice-mail list could be used. Again, this should be fairly easy to put into practice. If the communication is longer or if a written transcript is useful, fax and electronic mail connections should be utilized. Despite the obvious usefulness, this may be more difficult to "sell" but its implementation would be a valuable signal to the institution.

Formal networks that tie mid-managers together specifically to strengthen IT/institutional initiatives are important. The nature and make-up of these groups tend to be unique to the campus, but when they function well they are perhaps unequalled as an institutional feedback loop. As in the case above, this network should use multiple electronic means of communication. Similarly, networks that link supervisors and/or front-line workers should be encouraged and supported. These networks must also be used to functionally bind together academic and administrative systems, people, and functions.

Some other methods the IT unit might use to solidify IT/institutional linkage follow:

(1) Assign specified members of the IT staff to client departments for one- to-two-week stays annually. This broadens understanding of the IT staff and enable departments to utilize a level of expertise perhaps not otherwise available for their own projects.

(2) Hold periodic one-day retreats for client groups where they set the agenda for discussion and/or education. Such meetings permit issues to be openly addressed that might otherwise remain below the surface and have negative impacts.

(3) Encourage the creation of positions requiring strong IT backgrounds in client departments, and then cultivate these individuals as allies as well as knowledgeable critics.

(4) Work with interested academic leadership to develop pilot or demonstration projects illustrating effective utilization of IT in teaching, research, and academic administration.

Be a Knowledge Seeker and Technology Transfer Agent

If an institution is to have information available as needed, it must build a corporate database and provide broadbased access to it. The systems architecture will vary from place to place, but some pertinent common database characteristics exist. They include:

- easily accessible up-to-date summary information that relates to senior-level decision-making,
- easily usable programs which allow exploration of successively greater levels of detail from the summary level down to data elements,
- longitudinal comparison data,
- integrated subsystems which accommodate cross-functional analysis,
- routine operational reports available online,
- operational reports and access mechanisms designed to support client/customer service by front-line workers,
- reasonably straightforward ad hoc retrieval and report generation capabilities, and
- the capability to do ad hoc statistical analysis on subsets of the database.

The development of a corporate database will require some institutions to modify current practices by opening access to all who have a need to know, moving to the concept of data custodians rather than data owners and probably emphasizing the need for privacy, security, and overall data management practices to far more people across the organization. This may well cause initial nervousness, but it opens the door for processes and procedures to be examined in a new light and for long-held assumptions to be totally reformulated. True transformation is not possible without movements such as these.

One way to seek knowledge is through experimentation. Even in the tightest of budgetary situations, it is important for IT units to explore the usefulness of new products and new approaches to existing processes. Through such experimentation and sharing of results, both positive and negative, IT units can play an important role for the institution. In many cases it is much easier for IT units to gain access to new technology for test purposes than it is for other campus units. This can be done by setting up demonstration labs containing both hardware and software, securing short-term loans of equipment, being an alpha or beta test site, or by entering into partnership agreements with technology vendors.

Another way to seek knowledge is through communication with other knowledge seekers. Any college or university campus is full of such opportunities. The IT unit needs to be aware of as many researchers, innovative instructors, and creative administrative personnel as possible, to encourage and support them in their efforts, and to help publicize their findings. Where feasible, forming internal partnerships with such people will almost assuredly result in associations that are mutually attractive and sometimes useful to the entire campus community.

Part of the role of technology transfer agent has already been addressed—widely publicizing results from IT unit experimentation and helping to publicize others' findings. Some other actions include:

- sponsoring on-campus vendor demonstrations or workshops,
- sharing materials and presenting concepts from seminars, short courses, or workshops that IT staff have attended,
- setting up an IT library which may well contain publications not available in campus libraries,
- including in the annual IT tactical plan a list of the most significant IT trends, and
- providing an ongoing education and training program that addresses needs related to the campus IT infrastructure.

Playing the part of technology transfer agent with interested, involved, and excited people is fun. Another significant aspect of the role, however, is in providing encouragement to those who lag behind. They may be technophobic, have opposing philosophical ideas, lack resources, work for someone who does not like technology, or a host of other reasons. Whatever the cause may be, the IT unit, or—depending on the individual—the CIO or IT champion must find a lever to help move those who lag along the scale. Such people may never become enthusiasts, but they must develop competency if they are to be functional in a reengineered workplace. Methods to accomplish this must be tailored to the specific situation and person and may well tax the leadership skills of the technology transfer agent.

One final technology transfer mechanism is to form networks designed for that purpose. A network of those involved in technological experimentation might be useful. A network whose members are asked to scan and share pertinent information from one or more publications could reduce the time required by IT professionals to "keep up." A help network designed for those who lag behind might be one way to bring them along by offering an electronic, less personal means of asking questions and getting answers without embarrassment.

Communicate within the IT Unit and with the Institution

The importance of linking the IT plan with the institution's strategic plan has already been stressed. When that is done properly, the IT plan then becomes a significant communication vehicle and should be publicized and widely distributed. All academic and administrative units should get a copy, and copies should be available for any other interested individual. A wide distribution requires that it be readable (not full of technological jargon), that it be relatively short (not more than ten to twelve pages), and that it contain mid-term (three-to-five-year) campus IT goals and current year objectives. This provides people with a picture of where the campus is going through the use of technology and what to expect immediately. The tenor of the plan should be ambitious but realistic in light of identified resources. It should never have a pie-in-the-sky tone or it will not be taken seriously. The bottom line is to tell people up front what is going to be done and then do it. It takes only a few cycles of "saying and doing" for the IT plan to become an important campuswide communication document.

Once a planning process is in place, it is important for as many people as possible to understand how the plans will be implemented and how planning and management are related. If an institutional strategic planning and management model is used, the connections are easy to make. Goals in unit plans roll up and contribute to tactical plan goals which in turn roll up into strategic plan goals. Goals at each level spawn objectives, and then, from unit level objectives, individual work plans are derived which provide coordinated guidance for the year's activities. It is essential to understand that the process does not set plans in concrete. They can and usually do change when opportunities occur or crises arise, but the changes are coordinated so that progress toward stated aims is maintained.

The communication process is significantly enhanced by a formal advisory/shared governance structure. Often this is accomplished through a steering committee for IT policy, and separate advisory committees for academic technology development, administrative systems development, and IT organization operations. Through such a structure, a constant open line of communication can be maintained, priorities established, hypotheses tested, and plans developed.

Where an institutional strategic planning and management model is not in place, it is the responsibility of the CIO or champion to devise a system that will support the the IT plan. Such systems will vary from school to school and from one major administrative unit to another, based upon differing agreements between policy officers. Although more difficult, the task is not impossible. The CIO or champion then needs to see that appropriate people in the academic and administrative divisions have a good understanding of the planning and management linkage in their respective units.

Having set forth a plan containing specific measurable objectives, it is essential to account for the outcomes—both tallying the completed objectives and broadly publicizing the results. Additional steps are also useful. Setting up a process that gauges client satisfaction can be a good public relations move and provide invaluable feedback at the same time. The assessment of performance perception must be objectively conducted. Most institutional research offices have the expertise and credibility to do this well. Monthly assessments based on a statistically valid sample of the client population provide the best data, but the process must be carefully managed to ensure adequate return rates over the long haul. Whether satisfaction ratings are taken monthly, quarterly or annually, the results should be distributed to client groups, with comparisons to past ratings. Obviously, if perceptions of performance are not satisfactory or have declined from past levels, remedies must be applied.

Setting high standards and then measuring actual perfor-

mance against them is another way to establish criteria for excellence. One methodology suggests that eight variables be chosen which, taken together, provide an overview of how well the unit is performing. The actual performance of each variable can be plotted against the goal on a monthly chart. This set of octographs can be given to the CIO, executive officers, oversight or advisory committees, IT department managers, and other interested groups or individuals.[60] Variables which lend themselves to this type of measurement include up-time for online systems, successfully completed jobs in batch processing, response time for online systems, the number of errors per unit of measurement for a variety of processes, estimated hours of programming for service requests, statistics for network operation, the proportion of IT tactical plan objectives that are on target, etc.

The same variables which can readily be depicted with octographs are also good candidates for the application of total quality management techniques. To attain the magnitude increases in quality called for in reengineering, TQM or similar methodologies must be employed. There is no better place to begin TQM than in a highly visible, important area. This commitment emphasizes the seriousness of the endeavor, and, as results become evident, it provides a persuasive success story and generally guarantees recognition of the merits of TQM.

Much has been written in this section about publicizing results. In fact, many IT units are not very good at doing that. Information resources management organizations, especially those with print units and/or creative media units, have distinct advantages over other IT organizations in this area. Publications, either printed or electronic, need to have a professional look, with reassuringly proficient format, graphics, typography, and color highlights. IT unit newsletters should be just that—news letters. They should contain articles of interest for their constituency and be carefully edited to avoid jargon where possible and to explain it in the few places it cannot be avoided. The IT annual report can be one of the most effective communication pieces that is produced. It should contain a lead article from the champion or CIO that stresses a theme and links the past year to the future, highlights from each IT department, a summary of IT accomplishments from across the campus, and an article that tells how well IT objectives were accomplished. Octographs provide good graphics for an annual report. The annual report should minimally be sent to the same mailing list as that of the IT tactical plan and perhaps to the newsletter mailing list.

Although meetings are the plague of most leaders and managers they can be effective means of communication. Meetings that aid communications include:

- an annual retreat with primary clients,
- an annual report to the entire IT staff which includes a question and answer period,
- an annual meeting between the CIO or IT leader and each executive officer and/or dean,
- an annual presentation to the academic senate,
- periodic meetings with policy or advisory committees where at least part of the agenda is open, and
- periodic meetings with individuals of influence.

Finally, many of the networks previously discussed can sometimes be used effectively for communication purposes. This use, however, must be judicious and be directly related to the purpose of the network.

Provide Solutions Now

Accurate or not, it is not uncommon for college and university executive officers to believe that many mid-managers play budget games. An example of this is where a manager proposes to complete a fairly elaborate project which is needed by the institution *if and only if* he/she receives a substantial budget augmentation. An immediate executive officer reaction, particularly in stringent fiscal times, might be to wonder how much could be done without an augmentation by delaying other "less important" projects. If 80 percent of the project could be completed, how significant is the remaining twenty percent? And why was the proposal not presented with some options?

Another perception that might be directed toward IT management is that solutions which could be developed through existing technology or with well-proven, less expensive technology are too often tied to the latest state-of-the-art, most expensive alternatives. Such feelings by senior administrators must be completely put to rest if an environment that supports transformation is to be built.

The only real way for IT leaders to gain and maintain credibility on issues of this nature is to provide solutions to institutional problems within the confines of the existing information technology infrastructure with allocated resources. This is not to say that the total solution never requires additional money, people, equipment, and software, or that one should never try to persuade senior administrators to get the very best. Rather, it is our belief that producing with what you have, in the long run, is the single best way to gain new resources and to build an understanding of the strategic value of information systems.

Few institutions anywhere have taken full advantage of their own existing technology. Most IT managers are aware of several circumstances where they could apply technology to make a difference. One of the first steps in reengineering is to take the initiative, form an internal partnership with an application area, and add functionality, improve a process, or implement a small system. Forming a small unit—perhaps by borrowing a few hours per week from IT knowledge workers with expertise in LANs, desktop applications, and major administrative systems—that focuses on providing solutions to problems that have previously been ignored, could have enormous benefit. Many institutions have an accumulation of small problems which are never addressed that take a significant toll on overall productivity.

IT managers have long practiced the proven axiom of looking for high payoff opportunities that affect a significant part of the institution. Moving to a common relational

database across the campus, instituting CASE methodologies and/or object oriented programming for development, integrating voice, data, and video into a campus backbone network, providing graphical user interface front-end applications, and installing major administrative application systems are common examples. This must continue if reengineering is to occur. All of these examples are probably necessary to establish an IT infrastructure capable of supporting transformation.

Nolan notes that executives must apply the lesson that technology drives transformation.[61] IT leaders must be in the forefront of those who make this point, and too often have not been. This may relate to computing managers having gained a reputation for promising more than automation could ever deliver which, in turn, led to acceptance of the idea that computing is just another "tool" to help students, faculty, and administrators do what they do faster and more efficiently. It is now clear that information technology is far more than just another tool—it is an enabling force.[62]

In continuing to implement high payoff information technology projects, IT leaders must lead the way to encourage simultaneous change in processes and procedures that can foster significant improvement in the quality of service. One effective method for overcoming organizational resistance and defensive reasoning, which will surely occur, is to persuade the president/chancellor to appoint a reengineering task force with membership from each executive officer area to study and make recommendations regarding the changes needed for true transformation. The IT champion or CIO might play a role in the education of task force members regarding reengineering principles before they begin their work, and an IT leader must be one of the task force members.

Part of the charge to a reengineering task force should be to generate as much support for these recommendations as possible. A significant aspect of their work, then, is to carry the message of transformation to mid-managers and front-line knowledge workers. By stressing principles such as empowerment as well as six-sigma productivity increases, reengineering can be a bottom-up as well as a top-down process. The greater bottom-up/top-down balance that can be attained, the quicker the transformation can occur. If the reengineering task force members work well together and achieve reasonable success, consideration should be given to the idea of converting the task force to a formal network and having their work continue indefinitely.

Most IT units are now doing the kinds of things discussed in this section, but very few are doing all of what has been suggested. There may not be many IT organizations, given the circumstances that most face, who can commit to "doing it all" without incurring substantial risk. But stepping up to take the risk really is part of what transformation is all about. We must provide solutions now, better solutions than we have historically provided, and at the same time we must build for the future of our institution. It is not easy. It requires a very big commitment. The commitment encompasses the IT unit but goes far beyond it. If the decision to transform is made, IT units must willingly accept the inherent risks, recognizing that there will also be risk and support by the entire institution.

Footnotes, Section 3:

[57] Mario M. Morino, "Managing and Coping with Change: An IS Challenge," *Journal of Information Systems Management*, Winter 1988, pp. 74, 76.

[58] Ibid., pp. 76-77.

[59] Thomas J. Sergiovanni, "Adding Value to Leadership Gets Extraordinary Results," *Educational Leadership*, May 1990, pp. 23-24.

[60] Thomas Stuelpnagle, "Octograph Your Boss," *So You Want To Be President*, unpublished manuscript, pp. 89-100.

[61] Richard L. Nolan, "Too Many Executives Today Just Don't Get It!," *CAUSE/EFFECT*, Winter 1990, p. 6.

[62] James I. Penrod, "What Will It Take To 'Get It' In Higher Education?," *CAUSE/EFFECT*, Winter 1990, p. 14.

Conclusion

Reengineering requires different management from what we are accustomed to experiencing. The new management must be primarily proactive as opposed to the more familiar reactionary style. The process of transformation is the initiation of a whole new order. It will change all organizational units including the IT unit. In a reengineered environment the IT infrastructure is organic, it is inseparable from application functions, it becomes the nervous system for the total organization. The IT unit will be responsible for the evolutionary design and development of the infrastructure. It will also have ongoing responsibility, shared with all other units, for operation of the infrastructure.

In many ways, colleges and universities may well have significant advantages over business and industry in reengineering. Elements of an entrepreneurial organizational culture are already in place in many institutions, especially in instructional and research segments of campuses. The organizational and decision-making structure, particularly in large and/or research universities, may resemble the new order much more than in correspondingly complex business enterprises. Certainly the idea of creating a learning organization with empowered people striving for creativity and innovation is congruent in a higher education setting.

On the other hand, putting institutional mission before divisional or disciplinary priorities, eliminating unnecessary programs and redistributing scarce resources, reexamining and redefining long held assumptions, finding new ways to measure what we do, changing the parameters for the way leaders are selected, and redefining the internal reward structure of the institution may prove to be very difficult to accomplish in any college or university.

The environmental factors are such that major change must come in higher education. Hard decisions must be made and some of them will be painful. Reengineering requires hard decisions and decisive actions but offers the hope of a new order.

At least one premier West Coast research university has considered the implications of embarking upon the road to transformation. UCLA recently completed an eighteen-month study to determine how to improve efficiency and the delivery of services, culminating in a report entitled *Transforming Administration at UCLA: A Vision and Strategies for Sustaining Excellence in the 21st Century*. The report sets forth an aggressive reengineering agenda to move UCLA from a bureaucratic environment to a network organization, beginning in the spring of 1992. UCLA Chancellor Charles E. Young, in a letter to the senior administrative staff which accompanied the report, stated the following:

> We must reassert that our fundamental missions are teaching, research and public service. And we must systematically reassess the activities of our support units, which are so critical to the institution's success, to improve our effectiveness in fulfilling our responsibilities. UCLA must become more agile and better able to respond quickly to new challenges and changing priorities. We must encourage and reward creative thinking, innovation, initiative and responsible risk-taking. We must decentralize and empower employees at lower levels to act, and reduce the practice of deferring routine decision-making to executive levels. We must delegate more responsibility to department heads and hold them accountable. We must reduce paperwork, regulations and procedures. We must encourage teamwork and collaboration within and across units. We must reward contributions to institutional goals, and reduce our tendency toward parochialism.
>
> In essence, we must move away from a civil service culture and toward a more businesslike culture that stresses quality, service and cost containment. In pursuing these goals, we must rededicate ourselves to openness and honesty and the free exchange of ideas that is the hallmark of a great public university. And we must invest in our people. We must devote more attention to employee growth and development within our organization and enable our people to make full use of their skills and abilities.

This is a promising, perhaps barrier-breaking action by one of the great and most progressive public institutions in the world. Hopefully, others will soon follow and colleges and universities in the United States will be on their way to transforming higher education and leading our society into the information/service economy of the next century.

IT leaders and managers must be among those at the forefront of the reengineering movement. We believe that those who are not will eventually be replaced. Being an early leader requires the IT manager to reconceptualize his or her role in the organization. We must answer the question of "Can we survive?" with a resounding, "We must survive if the institution is to thrive!"

Bibliography

Adler, Paul S., and Aaron Shenbar. "Adapting Your Technological Base: The Organizational Challenge." *Sloan Management Review*, Fall 1990, pp. 25-37.

Ahituv, Niv, Dalia Even-Tsur, and Batami Sadan. "Procedures and Practices for Conducting Postevaluation of Information Systems." *Journal of Information Systems Management*, Spring 1986, pp. 61-65.

Alfred, Richard L., and Marian Horowitz. "Higher Education and Public Perception: Dynamics of Institutional Stature." *Journal for Higher Education Management*, Summer/Fall 1990, pp. 7-28.

Alter, Allan E. "The Corporate Make-Over." *CIO Magazine*, December 1990, pp. 32-42.

Alterowitz, Ralph. "Viewpoint: 'All Beginnings Are Hard.'" *Journal for Higher Education Management*, Summer/Fall 1990, pp. 77-82.

Argyris, Chris. *Overcoming Organizational Defenses*. Boston: Allyn and Bacon, 1990.

Atkinson, Robert A. "Positioning a Strategic Planning Initiative for Success." *Journal of Information Systems Management*, Winter 1991, pp. 67-70.

Bardo, John W., Robert H. Ross, and Esther L. Headley. "Measuring Alumni's Image of a University." *Journal for Higher Education Management*, Summer/Fall, pp. 29-44.

Bartlett, Christopher A., and Sumantra Ghoshal. "Matrix Management: Not a Structure, a Frame of Mind." *Harvard Business Review*, July/August 1990, pp. 138-145.

Beckhard, Richard. "The Executive Management of Transformational Change." In *Corporate Transformation: Revitalizing Organizations for a Competitive World*. San Francisco: Jossey-Bass, 1988.

Bennett, John B. "Collegiality as 'Getting Along.'" *AAHE Bulletin*, October 1991, pp. 7-10.

Berry, Leonard L., Valarie A. Zeithaml, and A. Parasuraman. "Five Imperatives for Improving Service Quality." *Sloan Management Review*, Summer 1990, pp. 29-38.

Bitran, Gabriel R., and Johannes Hoech. "The Humanization of Service: Respect at the Moment of Truth." *Sloan Management Review*, Winter 1990, pp. 89-96.

Block, Peter. *The Empowered Manager*. San Francisco: Jossey-Bass, 1987.

Bole, Giles G., Jr., et al. *Enhancing Quality in an Era of Resource Constraints*. Ann Arbor, Mich.: University of Michigan, March 1990.

Bonafield, Christine. "Networking the Networks." *Communications Week*, 8 October 1990, pp. 20, 28.

Braybrooke, D., and C. E. Lindblom. *A Strategy of Decision*. Glencoe, Ill.: Free Press, 1963.

Breslin, Richard D., D. M. Clarke, J. Cronin, T. Ehrlich, D. N. Langenberg, H. McAninch, D. C. Swain. "Transforming Higher Education in the Information Age: Presidents Respond." *CAUSE/EFFECT*, Fall 1991, pp. 6-12.

Brindley, Lynne J. "Information Technology and Its Potential to Transform." *KPMG Peat Marwick Management Issues*, February 1991, p. 3.

Brown, John Seely. "Research That Reinvents the Corporation." *Harvard Business Review*, January-February 1991, pp. 102-111.

Bryson, John M. *Strategic Planning for Public and Nonprofit Organizations*. San Francisco: Jossey-Bass, 1988.

Cage, Mary Crystal. "30 States Cut Higher-Education Budgets by an Average of 3.9% in Fiscal 1990-91." *The Chronicle of Higher Education*, 26 June 1991, pp. 1, 17.

California State University/Los Angeles. *1991/92 Strategic Plan for Information Resources Management*. 1992.

Carter, Margaret V. "Survey Studies Executive Compensation/Perks at Colleges and Universities." *Management Issues*, June 1990, pp. 7-8.

Cetron, Marvin J., and Margaret Evans Gayle. "Educational Renaissance: 43 Trends for U.S. Schools." *The Futurist*, September-October 1990, pp. 33-40.

Cetron, Marvin J., Wanda Rocha, and Rebecca Luckins. "Into the 21st Century—Long-Term Trends Affecting the United States." *The Futurist*, July-August 1988, pp. 29-40.

Chaffee, Ellen Earle. *Total Quality Management: A Guide to the North Dakota University System 1991-1992*. Publications Services Office, North Dakota State University, 1991.

Champy, James. "Organizational Revisionism." *CIO Magazine*, December 1990, p. 20.

Charan, Ram. "How Networks Reshape Organizations—For Results." *Harvard Business Review*, September-October 1991, pp. 104-105.

Charp, Sylvia. "The Basic Principles of Networking." *T.H.E. Journal*, April 1988, pp. 94-98.

Chikofsky, Elliot J., and James H. Cross II. "Reverse Engineering and Design Recovery: A Taxonomy." *IEEE Software*, January 1990, pp. 13-17.

Coate, L. Edwin. "TQM on Campus." *Nacubo Business Officer*, November 1990, pp. 26-35.

Coopers & Lybrand. "Innovative Financial Strategies for Colleges and Universities." *American Council of Education and the Council of Independent Colleges*, March 1986, pp. 7-12.

Cyert, Richard M. "Defining Leadership and Explaining the Process." *Nonprofit Management & Leadership*, Fall 1990, pp. 32, 36.

Davenport, Thomas H., and James E. Short. "The New Industrial Engineering: Information Technology and Business Process Redesign." *Sloan Management Review*, Summer 1990, pp. 11-27.

Dearden, John. "The Withering Away of the IS Organization." *Sloan Management Review*, Summer 1987, pp. 87-91.

Delisi, Peter S. "Lessons from the Steel Axe: Culture, Technology, and Organizational Change." *Sloan Management Review*, Fall 1990, pp. 82-84.

Dolence, Michael G. "Evaluation Criteria for an Enrollment Management Program." *Planning for Higher Education* 18, no. 1 (1989-90): 1.

Dolence, Michael G., Derek H. Miyahara, John Grajeda, and Christopher Rapp. "Strategic Enrollment Management and Planning." *Planning for Higher Education* 16, no. 3 (1987-88): 55.

Donovan, John J. "Beyond Chief Information Officer to Network Manager." *Harvard Business Review*, September/October 1988, pp. 134-140.

Drummond, Marshall E., Douglas Vinzant, and Wayne Praeder. "Paying for your Vision—Integrating the Planning and Budgeting Process." *CAUSE/EFFECT*, Fall 1991, pp. 21-27.

Eccles, Robert G. "The Performance Measurement Manifesto." *Harvard Business Review*, January/February 1991, pp. 131-137.

Erkkila, John, and Brendan Murphy. "Strategic Information: An economic analysis and case study." *Information Management REVIEW*, Winter 1989, pp. 25-36.

Ernst & Young. "The Landmark MIT Study: Management in the 1990s." Chicago: 1989.

Ewing, Tom. "10 MIS Megatrends—A Road Map for Strategic Planning." *InformationWeek*, 19 January 1987, pp. 26-43.

"Financial Management: Justifying Strategic MIS Projects." *Computer Economics*, May 1990, pp. 5-6.

Forcht, Karen A. "Defining Ethical Standards for the Information Age." *ISPNews* , March/April 1991, pp. 31-33.

Ford, Larry J. "Using Information Strategically: IBM Roadmap for the 1990s." IBM Customer Briefing, Beverly Hills, Calif., 9 November 1990.

Frank, Howard. "Managing networks versus networking management." *Networking Management*, December 1989, pp. 62-63.

Friend, David. "Benefits of an executive information system." *Information Management REVIEW*, Winter 1989, pp. 7-15.

Gabor, Andrea. "Deming's Quality Manifesto." *Best of Business Quarterly*, Winter 1990-91, pp. 6-10.

Gardner, Catherine, Timothy R. Warner, and Rick Biedenweg. "Stanford and the Railroad." *Change*, November/December 1990, pp. 23-27.

Gardner, John W. "Leadership and the Future." *The Futurist*, May-June 1990, pp. 9-12.

Garvin, David A. "Competing on the Eight Dimensions of Quality." *Harvard Business Review*, November-December 1987, pp. 104-108.

Gauthier, Michael R., and John G. Sifonis. "Managing Information Technology Investments in the 1990s." *Bulletin of the American Society for Information Science*, June/July 1990, pp. 16-19.

George, Joey F., and John L. King. "Examining the Computing and Centralization Debate." *Communications of the ACM*, July 1991, pp. 62-72

Gilder, George. "Into the Telecosm." *Harvard Business Review*, March/April 1991, pp. 150-161.

Gitlow, Howard S., and Shelly J. Gitlow. *The Deming Guide to Quality and Competitive Position*. Englewood Cliffs, N.J.: Prentice-Hall Inc., 1987.

Glick, Milton D. "Integrating Computing into Higher Education." *EDUCOM Review*, Summer 1990, pp. 35-38.

Gmelch, Walter H., and Rita G. Seedorf. "Academic Leadership Under Siege: The Ambiguity and Imbalance of Department Chairs." *Journal for Higher Education Management*, Summer/Fall 1989, pp. 37-44.

Gold, Bela. "Charting a Course to Superior Technology Evaluation." *Sloan Management Review*, Fall 1988, pp. 19-27.

Goodman, Paul S., Lee S. Sproull, and Associates, *Technology and Organizations*. San Francisco: Jossey-Bass, 1990.

Goold, Michael, and Andrew Campbell. "Brief Case: Pitfalls of Planning." *Long Range Planning* 23, no. 3 (1990): 106-107.

Gralla, Preston. "A Rock and a Hard Place." *CIO Magazine*, October 1988, pp. 47-52.

Grassmuck, Karen. From *The Chronicle of Higher Education*, 28 March 1990. Quoted in William F. Massy, "The Lattice and the Ratchet," The Pew Higher Education Research Program, *Pew Policy Perspectives* 2, no. 4 (June 1990): 2.

Gunner, Holly. "Competitive information strategy: Managing today's market and strategic information: New wine in old bottles?" *Information Management REVIEW*, Spring 1988, pp. 67-70.

Hammer, Michael. "Reengineering Work: Don't Automate, Obliterate." *Harvard Business Review*, July-August 1990, pp. 104-112.

_____. "Reengineering Your Business." AT&T Computer Systems Symposium, 2 April 1990.

Hahn, Dietger. "Strategic Management—Tasks and Challenges in the 1990s." *Long Range Planning* 24, no. 1 (1991): 26-39.

Hart, Christopher W.L., James L. Heskett, and W. Earl Sasser, Jr. "Soothing the Savage Customer." *Best of Business Quarterly*, Winter 1990-91, pp. 14-20.

_____. "The Profitable Art of Service Recovery." *Harvard Business Review*, July-August 1990, pp. 148-156.

Hayward, Mark. "What 1988's Managers Must Know about Technology." *Business Software Review*, January 1988, pp. 41-42.

Helms, R. M. "Introduction to image technology." *IBM Systems Journal* 29, no. 3 (1990): 313-333.

Henderson, John C. "Plugging into Strategic Partnerships: The Critical IS Connection." *Sloan Management Review*, Spring 1990, pp. 7-18.

Howard, Robert. "Values Make the Company: An Interview with Robert Haas." *Harvard Business Review*, September/October 1990, pp. 133-144.

Isachsen, Olaf. *Management: The Opportunity*. Coronado, Calif.: The Institute for Management Development, 1990.

Jessup, Leonard, and Sal Kukalis. "Better Planning Using Group Support Systems." *Long Range Planning* 23, no. 3 (1990): 100-105.

Johnston, William B. "Global Work Force 2000: The New World Labor Market." *Harvard Business Review*, March-April 1991, pp. 115-127.

Kador, John. "The Paths to Executive Support." *Information Center*, December 1989, pp. 22-27.

Kanter, Jerry. "Information Literacy for the CEO." *Journal of Information Systems Management*, Winter 1988, pp. 52-57.

_____. "New Tools, New Rules." *Information Strategy: The Executive's Journal*, Winter 1990, pp. 51-54.

Kanter, Rosabeth Moss. *The Change Masters—Innovation and Entrepreneurship in the American Corporation*. New York: Simon & Schuster, Inc., 1983.

_____. "Summaries from The Planning Forum's International Conference in Washington, D.C., April 29-May 2." *The Planning Forum Network*, July 1990, pp. 1-2.

_____. "Transcending Business Boundaries: 12,000 World Managers View Change." *Harvard Business Review*, May-June 1991, pp. 151-164.

Karten, Naomi. "The diplomacy of training." *Communications Week*, 9 July 1990.

Keck, Colleen A. "Information as Property: A Case Comment." *Patent World*, September 1987, p. 28-32.

Keller, George. *Academic Strategy: The Management Revolution in American Higher Education*. Baltimore and London: Johns Hopkins University Press, 1983.

Keller, George, and Ann McCreery. "Making Difficult Educational Decisions: Findings from Research and Experience." Paper presented at the 25th Annual Conference of the Society for College and University Planning, 31 July 1990.

Kennedy, Paul M. "Preparing for the 21st Century." *The Planning Forum Network*, June 1991, pp. 2, 6.

Kiely, Thomas. "Diebold New World." *CIO*, June 1991, pp. 85-90.

Kilmann, Ralph H., Teresa Joyce Covin, and Associates. *Corporate Transformation: Revitalizing Organizations for a Competitive World*. San Francisco: Jossey-Bass, 1988.

King, William R., and T. S. Raghunathan. "How Strategic Is Information Systems Planning?" *Datamation*, 15 November 1987, pp. 133-137.

Konstadt, Paul. "From Big Bang to Big I.T." *CIO Magazine*, February 1991, pp. 62-68.

Koontz, Katy. "Six Ways to Motivate Your Staff." *Sourcebook*, Summer 1990, pp. 22-29.

Kotter, John P. "What Leaders Really Do." *Harvard Business Review*, May/June 1990, pp. 103-111.

Krass, Peter. "Are You Getting What You're Worth?" *InformationWeek*, 15 April 1991, pp. 44-52.

_____. "Building a Better Mousetrap." *InformationWeek*, 25 March 1991, pp. 24-30.

_____. "MIS Execs: Reengineering Is Top Priority." *InformationWeek*, 3 December 1990, p. 13.

Langfitt, Thomas W. "The Cost of Higher Education." *Change*, November/December, 1990, pp. 8-15.

Layne, Richard. "The World According to Mike Hammer." *InformationWeek*, 3 July 1989, pp. 36-38.

Lee, John Y. "JIT works for services too." *CMA Magazine*, July/August 1990, pp. 20-23.

Leibs, Scott. "The Ultimate Interface." *InformationWeek*, 25 June 1990, pp. 46-48.

Lewis, Brenda. "Marketing success in the 1990s: Characteristics of an intelligent corporation." *Information Management REVIEW*, Spring 1990, pp. 15-22.

Lockwood, Russ. "The Electronic Office." *Personal Computing*, 25 May 1990, pp. 74-82.

Madron, Thomas W. "Enterprise Computing in Higher Education." *T.H.E. Journal*, June 1991, pp. 60-65.

Mainelli, Michael R., and David R. Miller. "Strategic Planning for Information Systems at British Rail." *Long Range Planning* 21, no. 4 (1988): 65-75.

Makens, James C. "Yield Management: Pricing Strategy of the '90s?" *Marriott's PORTFOLIO*, November/December 1989, pp. 14-18.

March, James G., editor. *Handbook of Organizations*. Chicago: Rand McNally, 1965.

March, James G., and Herbert A. Simon. *Organizations*. New York: John Wiley, 1958.

Marchand, Donald A. "IMR interview: Mike Hammer." *Information Management REVIEW* 2, no. 4 (1987): 83-90.

_____. "Infotrends: A 1990s outlook on strategic information management." *Information Management REVIEW* 5, no. 4 (1990): 23-32.

Massy, William F. "A Strategy for Productivity Improvement In College and University Academic Departments." Presented at the Forum for Postsecondary Governance, Santa Fe, N.M., October 1989.

_____. "The Lattice and the Ratchet." The Pew Higher Education Research Program, *Pew Policy Perspectives* 2, no.4 (June 1990): 1-8.

McFarlan, F. Warren. "Keynote speech for the 1991 Information Resources Management Association International Conference in Memphis, Tenn., May 1991." *Information Resources Management Journal*, Fall 1991, pp. 39-41, 27.

McNaught, Jay. "Thirty-Seven More Ways to Improve Training." *Information Center*, August 1990, pp. 19-23.

Melchiori, Gerlinda S. "Managing Institutional Image." *Journal for Higher Education Management*, Summer/Fall 1990, pp. 45-58.

Meyer, Gary. "The Best Laid Plans." *Information Strategy: The Executive's Journal*, Winter 1990, pp. 32-37.

Mintzberg, Henry. "The Effective Organization: Forces and Forms." *Sloan Management Review*, Winter 1991, pp. 54-67.

Moad, Jeff. "Miles To Go." *Datamation*, 15 March 1991, pp. 62-65.

Morino, Mario M. "Managing and Coping with Change: An IS Challenge." *Journal of Information Systems Management*, Winter 1988, pp. 74, 76.

Morison, Robert E. "Beyond Centralized and Decentralized IS: Virtual Centralization." *Information Strategy: The Executive's Journal*, Spring 1991, pp. 5-11.

Morril, Richard. "How to Manage Value Conflict." *Management Issues*, September 1990, pp. 1-4.

Morton, Michael S. Scott. *The Corporation of the 1990s: Information Technology and Organizational Transformation*. New York: Oxford University Press, 1991.

Murphy, David E., and Louis C. Stamatakos. "University-wide Planning as an Integrative Decision-making Endeavor." *Journal for Higher Education Management*, Summer/Fall 1989, pp. 27-35.

Neumann, Anna, and Estela M. Bensimon. "Constructing the Presidency." *Journal of Higher Education*, November/December 1990, pp. 678-701.

Nolan, Richard L. "Too Many Executives Today Just Don't Get It!" *CAUSE/EFFECT*, Winter 1990, pp. 5-11.

Nonaka, Ikujiro. "Toward Middle-Up-Down Management: Accelerating Information Creation." *Sloan Management Review*, Spring 1988, pp. 9-18.

O'Shea, Timothy J. "A Piecemeal EIS Is Better Than No EIS." *Information Strategy: The Executive's Journal*, Fall 1989, pp. 30-34.

Oman, Ray C., and Tyrone Ayers. "Productivity and benefit-cost analysis for information technology decisions." *Information Management REVIEW*, Winter 1988, pp. 31-41.

Paller, Alan. "Executive Information Systems Carve New Paths Through the Information Forest." *Bulletin of the American Society for Information Science*, April/May 1990, pp. 28-29.

Parasuraman, A., Leonard L. Berry, and Valarie A. Zeithaml. "Understanding Customer Expectations of Service." *Sloan Management Review*, Spring 1991, pp. 39-47.

Pearson, Andrall E. "Ideas From 'Tough-Minded Ways to Get Innovative.'" *Harvard Business Review*, May/June 1988, pp. 99-106.

Penrod, James I. "Special Report to the Ad Hoc Task Force on Reengineering Work Flow at CSLA," June 1990.

_____. "What Will It Take To 'Get It' In Higher Education?" *CAUSE/EFFECT*, Winter 1990, p. 14.

Penrod, James I., and Michael G. Dolence. "Concepts for Reengineering Higher Education." *CAUSE/EFFECT*, Summer 1991, p. 10.

Penrod, James I., and Thomas W. West. "Strategic Planning for Computing and Communications." In *Organizing and Managing Information Resources on Campus*. McKinney, Texas: Academic Computing Publishers, Inc., 1989.

Performance Research Associates. "The Top 10 Barriers to Service." *The Sourcebook*, Fall 1990, pp. 28.

Porter, Michael E. *Competitive Strategy*. New York: The Free Press, 1980.

_____. *The Competitive Advantage of Nations*. Glencoe, Ill.: Free Press, 1990.

Postman, Neil. "Six Things Worth Knowing about Technology." *CAUSE/EFFECT*, Fall 1991, pp. 46-48.

BEST COPY AVAILABLE

Purcell, F. J. "Taming of the Paperwork Monster." *Information Center*, June 1990, pp. 25, 27.

Quinn, James Brian, and Penny C. Paquette. "Technology in Services: Creating Organizational Revolutions." *Sloan Management Review*, Winter 1990, pp. 67-77.

Quinn, James Brian, Thomas L. Doorley, and Penny C. Paquette. "Technology in Services: Rethinking Strategic Focus." *Sloan Management Review*, Winter 1990, pp. 79-87.

Raimond, Paul, and Colin Eden. "Making Strategy Work." *Long Range Planning*, October 1990, pp. 97-105.

"Re-engineering for business success." *AT&T Dataline*, Spring 1990, p. 4.

Reimann, Bernard C. "Challenging Conventional Wisdom: Corporate Strategies That Work." *Planning Review*, September-October 1991, pp. 38-45.

Rathswohl, Eugene J. "Information Resource Management and the End User: Some Implications for Education." *Information Resources Management Journal*, Summer 1990, pp. 2-7.

Roach, Stephen S. "Services Under Siege—The Restructuring Imperative." *Harvard Business Review*, September-October 1991, p. 91.

Rockart, John F. "Chief executives define their own data needs." *Harvard Business Review*, March/April 1979, pp. 81-93.

_____. "The Line Takes the Leadership—IS Management in a Wired Society." *Sloan Management Review*, Summer 1988, pp. 57-64.

Rockart, John F., and James E. Short. "The Networked Organization and the Management of Interdependence." In *The Corporation of the 1990s: Information and Organizational Transformation*. New York: Oxford University Press, 1991, pp. 212-215.

Rodgers, T. J. "No Excuses Management." *Harvard Business Review*, July/August 1990, pp. 84-98.

Romei, Lura K. "Managing the Changing Workforce." *Modern Office Technology*, October 1990, pp. 75-78.

Rosen, Larry D., and Michelle M. Weil. "Computers, Classroom Instruction, and the Computerphobic University Student." *Collegiate Microcomputer*, November 1990, p. 281

Rosen, Larry D., Deborah C. Sears, and Michelle M. Weil. "Computerphobia." *Behavior Research Methods, Instruments and Computers* 19, no. 2 (1987): 167-179.

Rosen, Larry D., and Phyllisann Maguire. "Myths and Realities of Computerphobia: A Meta-Analysis." *Anxiety Research* 3 (1990): 175-191.

Rosenthal, Stephen R. and Harold Salzman. "Hard Choices about Software: The Pitfalls of Procurement." *Sloan Management Review*, Summer 1990, pp. 81-91.

Rosser, James M. and James I. Penrod. "Computing and Libraries: A Partnership Past Due." *CAUSE/EFFECT*, Summer 1990, pp. 21-24.

Rubin, Michael Rogers. "Strategic planning in an information economy." *Information Management REVIEW*, Fall 1985, pp. 47-54.

Runyan, Linda. "40 Years on the Frontier." *Datamation*, 15 March 1991, pp. 34-57.

Russell, Leland A. *Handbook for the Future*. Irvine, Calif.: Innova Group, 1990.

Sakamoto, Shigeyasu. "Process Design Concept: A New Approach to IE." *Industrial Engineering*, March 1989, pp. 31-32.

Sanoff, Alvin P., and Sharon F. Golden. "Remapping American culture." *U.S. News & World Report*, 4 December 1989, pp. 60-64.

Schaffer, Robert H. "Demand Better Results—And Get Them." *Harvard Business Review*, March/April 1991, pp. 142-149.

Schaffer, Susan M. "The Case for Management." *NACUBO Business Officer* 24, no. 10, pp. 36-37.

Schein, Edgar H. "A General Philosophy of Helping Process Consultation." *Sloan Management Review*, Spring 1990, pp. 57-64.

_____. "Coming to a New Awareness of Organizational Culture." *Sloan Management Review*, Winter 1984.

Schlesinger, Leonard A., and James L. Heskett. "The Service Driven Company." *Harvard Business Review*, September-October 1991, p. 74.

Senge, Peter M. "The Leader's New Work: Building Learning Organizations." *Sloan Management Review*, Fall 1990, pp. 7-23.

_____. *The Fifth Discipline: The Art & Practice of the Learning Organization*. Doubleday/Currency: New York, 1990.

Sergiovanni, Thomas J. "Adding Value to Leadership Gets Extraordinary Results." *Educational Leadership*, May 1990, pp. 23-24.

_____. "Leadership and Preparing Educational Leaders." Mary Ann Alia Distinguished Lecture, California State University Los Angeles, School of Education, 24 September 1991.

Shirley, Robert C. "Strategic Planning: An Overview." *Successful Strategic Planning: Case Studies, New Directions for Higher Education*, No. 64. San Francisco: Jossey-Bass, 1988.

Simon, H. A. *Administrative Behavior*. New York: Macmillan, 1957.

Sirkin, Harold, and George Stalk, Jr. "Fix the Process, Not the Problem." *Harvard Business Review*, July/August 1990, pp. 26-33.

Slear, Tom. "Technology of the '90s: What's Next." *USAir Magazine*, March 1991, pp. 81-91.

Slevin, Dennis P., and Jeffrey G. Covin. "Juggling Entrepreneurial Style and Organizational Structure—How to Get Your Act Together." *Sloan Management Review*, Winter 1990, pp. 43-53.

Smith, Peter. "Beyond Budgets: Changing for the Better." *Educational Record*, Spring 1991, p. 26.

Spector, Bert A. "From Bogged Down to Fired Up: Inspiring Organizational Change." *Sloan Management Review*, Summer 1989, pp. 29-34.

Sproull, Lee, and Sara Kiesler. *Connections: New Ways of Working in the Networked Organization*. Cambridge, Mass.: MIT Press, 1991.

Stanton, Robert O. "The evolving role of the information professional in industry." *Information Management REVIEW*, Fall 1989, pp. 13-18.

Stegwee, Robert A., and Ria M.C. Van Waes. "The Development of Information Systems Planning Towards a Mature Management Tool." *Information Resources Management Journal*, Summer 1990, pp. 8-21.

Stewart, Doug. "Interview with Shoshana Zuboff." *OMNI*, April 1991, pp. 66-70, 88-94.

Strauss, Paul S. "New Themes Already Emerging for 1990s." *Office Systems '90*, December 1990, pp. 44-50.

Stuelpnagle, Thomas. "Octograph Your Boss." *So You Want To Be President*, unpublished manuscript, pp. 89-100.

Sullivan, Cornelius H., Jr. "The Changing Approach to Systems Planning." *Journal of Information Systems Management*, Summer 1988, pp. 8-13.

Taylor, Robert S. "Information values in decision contexts." *Information Management REVIEW*, Summer 1985, pp. 47-56.

Toffler, Alvin. *Power Shift: Knowledge, Wealth, and Violence at the Edge of the 21st Century*. New York: Bantam Books, November 1990.

Umbaugh, Robert E. "A Board of Directors for Information Services." *Information Strategy: The Executive's Journal*, Spring 1987, pp. 25-31.

United Way Strategic Institute. "Nine Forces Reshaping America." *The Futurist*, July-August 1990, pp. 9-16.

University of California/Los Angeles. *Transforming Administration at UCLA: A Vision and Strategies for Sustaining Excellence in the 21st Century*. 1991.

Venkatraman, N. "IT-Induced Business Reconfiguration." In *The Corporation of the 1990s: Information Technology and Organizational Transformation*. New York: Oxford University Press, 1991.

Von Simson, Ernest M. "The 'Centrally Decentralized' IS Organization." *Harvard Business Review*, July/August 1990, pp. 158-162.

Vrakking, W.J. "The Innovative Organization." *Long Range Planning*, April 1990, pp. 94-101.

Wallace, Patricia. "Colleges Should Develop New Ways to Meet the Training Needs of Business." *The Chronicle of Higher Education*, 19 December 1990, p. A36.

Walsh, Thomas. "Do a data center makeover." *Computerworld*, 9 July 1990, pp. 91-92.

Whitaker, Gilbert R., et. al. *Enhancing Quality in an Era of Resource Constraints: Report of the Task Force on Costs in Higher Education*. Ann Arbor, Mich.: University of Michigan, 1990.

Webster, James L., William E. Reif, and Jeffrey S. Bracker. "The Manager's Guide to Strategic Planning Tools and Techniques." *Planning Review*, November/December 1989, pp. 4-13.

Weil, Michelle M., Larry D. Rosen, and Deborah C. Sears. "The Computerphobia Reduction Program: Year 1. Program development and preliminary results." *Behavior Research Methods, Instruments, & Computers* 19, no. 2 (1987): 180-184.

Wellins, Richard S., William C. Byham, and Jeanne M. Wilson. *Empowering Teams*. San Francisco: Jossey-Bass, 1991.

Weinman, Eliot D. "The Promise of Software Reengineering." *Information Week*, 22 April 1991, pp. 32-40.

Weissman, Julie. "Institutional Image Assessment and Modification in Colleges and Universities." *Journal for Higher Education Management*, Summer/Fall 1990, pp. 65-75.

Weitzel, John R. "Strategic information management: Targeting information for organizational performance." *Information Management REVIEW*, Summer 1987, pp. 9-19.

Weitzen, H. Skip. "Infopreneurs: Turn data into dollars." *Information Management REVIEW*, Summer 1989, pp. 9-21.

West, Thomas W. "Being Lean and Meaningful in the 1990s." *CAUSE/EFFECT*, Fall 1991, pp. 3-5.

Winkler, Connie. "An Illuminating CEO-CIO Alliance." *Datamation*, 15 August 1990, pp. 80, 82.

Woodsworth, Anne. "Computing Centers and Libraries as Cohorts: Exploiting Mutual Strengths." *Computing, Electronic Publishing and Information Technology*, 1988, pp. 21-34.

Zemsky, Robert, and William F. Massy. "Cost Containment: Committing to a New Economic Reality." *Change*, November/December 1990, pp. 16-22.

Zuboff, Shoshana. "Can Research Reinvent the Corporation?" *Harvard Business Review*, March/April 1991, pp. 164-175.

_____. *In the Age of the Smart Machine*. New York: Basic Books, Inc., 1988.

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